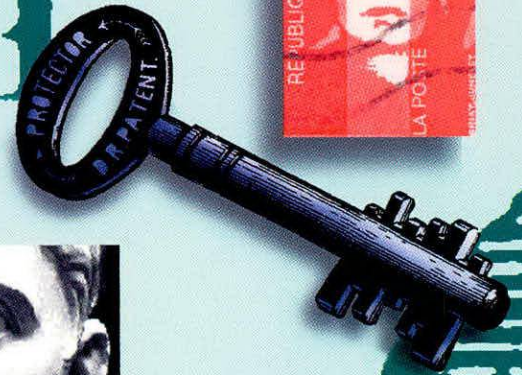
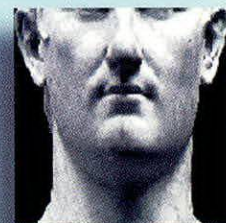


Ora.com

O'REILLY & ASSOCIATES, INC.

FALL 1994



On the Threshold of Change

"Our goal is to create context, to excite curiosity, and to share our own joy in the magic that happens when millions of people worldwide are building a shared technology and a shared knowledge base."

Looking over this fourth issue of *ora.com*, I wonder what happened to the little company with the narrow focus on UNIX? I'm a little blown away by the number and diversity of books we publish; it crept up on me! And if I find it a bit overwhelming, how must our readers feel?

Back in 1986, when we sent out some of our early mailings about the first seven Nutshell Handbooks®, people would call up and say, "I'll take all of them." That's a little more difficult now, with over 100 titles in our catalog and a range of topics that appeal to very different audiences. We've actually thought of splitting up our catalog into smaller, targeted subcatalogs, but have been reluctant to do it, for reasons I'll explain below.

I've always been a fan of establishing structures that make "too much information" into "just the right amount." As Edwin Schlossberg once said, "The skill of writing is to create a context in which other people can think." You can think of *ora.com* as one attempt to create that context, one in which our readers—no longer just UNIX programmers, system administrators, and power users—can think about the technologies represented by our books.

Some elements of that context are fairly obvious. We've organized our catalog into five major categories:

- Using the Internet
- System and Network Administration
- Using UNIX and X
- Programming
- Business, Careers, and Travel

Programming is in turn divided into five focused subcategories:

- X Programming
- C Programming Libraries
- UNIX/C Programming Tools
- Fortran and Scientific Computing
- Multiplatform Programming

This organization is fancifully represented as a cluster of interconnected islands in the "treasure map" insert to the catalog.

A Web of Connections

Making distinctions like these is important, so that readers who are simply looking for new Internet books, for example, don't have to wonder what the heck "curses" is for and whether they need to know about it. But it's also important to recognize just how interconnected these subjects can be.

A reader who starts out as an Internet user on a Mac or PC might find she needs to know a bit about UNIX in order to get the most out of the UNIX shell account offered by her Internet provider. And once the foot is in that door, perhaps the interesting smells from the kitchen urge the door open a little wider . . . and soon the intrepid user discovers that she can get a lot more out of the Internet with a powerful scripting language like Expect/Tcl or Perl.

Or going in another direction, a user hooked on Mosaic wants to start offering Internet information rather than just being a consumer. He finds himself perusing our new *Managing Internet Information Services*, and because most of the Internet's most powerful information server technologies are UNIX-based, he starts getting more and more intrigued with UNIX system and network administration—the bones, ligaments, and muscles under the skin of the Internet.

Or that same user might be fascinated by the diversity of image data available on the Internet and find himself trying to figure out how to view a file stored in an obscure data format. Suddenly, he discovers that *The Encyclopedia of Graphics File Formats*, which we've categorized under Multiplatform Programming, has just the information he needs.

Precisely because of this web of connections, we've rejected the idea of splitting our catalog into targeted sub-catalogs that we send out only to the most qualified prospects.

This might make better direct-marketing sense, but ultimately, it would not serve our audience half so well. You see, there is a logic to the topics we cover. We've developed our different lines of books by following our own curiosity, exploring a web of connections that exist in the real world as well as just in our catalog. While some islands in our archipelago are more isolated than others, our readers may want to step from one to the other in unexpected ways, discovering or creating connections that we didn't imagine.

I don't think it's an accident that UNIX and the Internet overlap in so many ways. Both are twenty-five years old this year. Both are unique experiments in collaborative software development that could happen only in an environment where no one organization made all the rules or controlled all the givens. Each is the creation of many thousands of independent minds, each building on each other's work in a spirit of creative abandon.

Building a Shared Technology

That brings me back to the purpose of this unusual combination of catalog and magazine. Our goal is to create context, to excite curiosity, and to share our own joy in the magic that happens when millions of people worldwide are building a shared technology and a shared knowledge base.

So, in addition to the treasure map, with its images of exploration, you'll see in this issue a collage of images representing not only our subject matter but our customers, in the form of the stamps we've received on letters from all corners of the globe. The world of information we're exploring is a puzzle with more than one solution, a mosaic whose beauty comes from the combination of thousands of tiny pieces whose pattern cannot always be seen up close.

Let me share with you one pattern I do see: Computers themselves will fade into the background over the next five to fifteen years. Much as people in the 1950s fussed over their cars, and many a young man could be found tinkering under the hood every weekend, now people fuss over their computers.

But as software becomes easier to use—and a startling example of a jump in ease of use can be seen in Mosaic and the World Wide Web as interfaces to the Internet—people who never cared much for computers will come to join the party, and even those of us who do like to tinker will find ourselves concentrating less on the computers themselves and more on what we want to do with them.

That's at least part of the logic behind GNN's focus, not on computer technology, but on areas like travel, education, and personal finance, and our move into new areas of publishing like business, careers, and travel. It's also why you'll be seeing new books from us on the social significance of computing, such as Steve Talbott's *The Future Does Not Compute*, which will be released in our next catalog.

We really are on the threshold of some amazing change in technologies we've taken for granted over the last fifteen years. The PC revolution is giving way to the Internet revolution, and the software revolution is giving way to the information revolution.

In changing times, flexibility and curiosity are advantages of the highest order. And both grow well in a rich compost of information and imaginative context.

Jim O'Reilly

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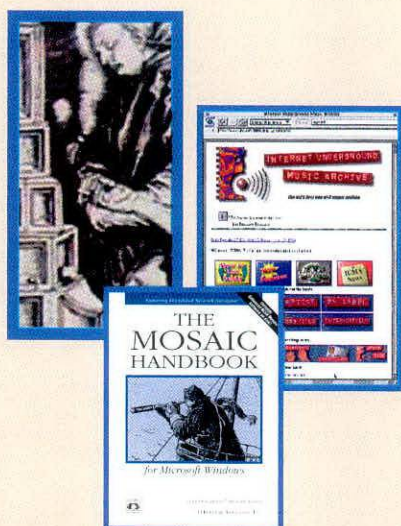
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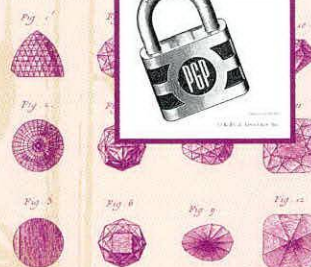
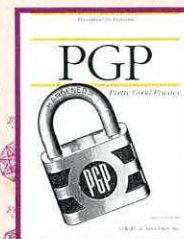
Stephen L. Talbott explores the social implications of information technology and the future of humanity

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letters@ora.

NOT A JOKE

It seems that your article "What Does It Take to Be a System Administrator?" (Summer '94) was either a joke I did not understand or that your definition of a system administrator differs significantly from mine.

In my view nobody with fewer skills than those you match with a "Senior System Administrator" should ever be given a root password. The skill levels required in your article are ridiculously low and as such the article insults every serious system administrator.

You focused a lot of attention on how many years the person had been administering systems. This might be an invalid indicator. The kind of people who haven't acquired all your listed skills (and more) by the end of their first year as a system administrator are probably not interested. Hiring an uninterested system administrator might be one of the worst things a company can do.

—Tom Bjorkholm

WHIZ KIDS

In the CAT (computer action team) we have our trainees load SunOS 4.1.1 on a Sun-3 and configure the machine as an NIS client, email client, and automounter client. In addition, we have the trainee run cops, install patches, reconfigure the kernel, partition the hard drive, and install elm (among other things). Trainees have three days to accomplish this goal.

Usually our trainees (typically college sophomores or juniors) fail during their first three-day attempt, but succeed during the second three-day attempt.

Your article said that a novice system administrator requires "two years of college or equivalent post high-school experience." One high school tenth grader, on apprenticeship with us during the summer, started the summer by successfully completing the load on his first attempt.

—Darrell Root

The guidelines we reprinted were put together by the System Administrator's Guild (SAGE), an organization devoted to developing system administration as a profession. We're sure SAGE did not mean to insult serious system administrators, since they are top administrators themselves. We'd also like to point out the difficulty of developing guidelines like these—no criteria will fit every case. We'll be glad to pass your feedback along to them.

A LABOR OF LOVE

I enjoyed reading Kevin Jameson's article about the problems of developing free software and making a living. Several years ago I wrote a version of the notorious TECO text editor. It's written in C, and runs under UNIX, MS-DOS, AmigaDOS, and VAX/VMS. I'm sure Kevin's book, *Multi-Platform Code Management*, would've come in handy for the project.

What began as an attempt to make a good editor for a tool-poor operating system (CPM/68k) evolved over several years into a complete implementation of DEC's TECO, for several platforms. I gave it away to anyone who wanted it, submitted it to the DECUS archives, and gave a few talks at DECUS conferences. Lots of people contacted me over the years, some to

help, others to report bugs, and some to tell me about their own implementations. I collected their remarks and built an anonymous ftp archive of TECO stuff, at [usc.edu](http://usc.edu/pub/teco) in pub/teco. I think it's the authoritative archive for what is admittedly an obsolete text editor.

It is the largest program I've ever written and consumed far more time than I'm prepared to admit. The effort taught me a lot about C and portability, and I made several email penpals around the world. I've made almost no money from it. One or two users talked me into accepting payment, explaining that they were investing in future support for the program. This added up to about \$185. I briefly considered making it shareware, but it seemed unrealistic with the vastly superior GNU-Emacs available for free, backed up by the perhaps morally superior GNU philosophy.

I began using GNU Emacs (didja know it originally evolved from TECO?) five years ago, and now rarely touch my old TECO code. I won't expend that much effort on a software project again without an expectation of compensation. I often wish I'd selected something more lucrative to turn into a labor of love.

—Pete Siemsen

FREE SOFTWARE PROFITS

I think your subtitle, "The Role of Free and Commercial Software in Today's Marketplace" is incorrect. It should be "The Role of Free and Proprietary Software in Today's Marketplace." My free software is commercial. My business is based on writing packet drivers (an MS-DOS TSR driver for Ethernet

com

cards). I sit squarely between the software vendors and the hardware vendors. Neither of them want to deal with drivers. Both think that the other party should be writing them. That's where I come in.

While at a university, I wrote a freely copyable set of packet drivers. The software vendors want to make sure that they can rely on the drivers and get support for them, so they pay me for support. The hardware vendors are always making changes to their hardware, so they pay me to write new drivers. And end users also pay me for support in installing and using them.

Now, maybe my business is a fluke and can't be replicated by anyone. However, it serves as proof that you can make money selling free software.

—Russell Nelson

MYSTICAL UNIX

I am a 17-year IBM mainframe veteran trying to hack my way into the brave new world of UNIX and open systems. I'm just finishing up UNIX 101 at the local university and had been wondering, "Where do I go from here?"

I decided that I should take a stab at one or two of the books with the funny animal pictures on them, and while browsing through the titles ran across *UNIX Power Tools*. It was as if God had taken control of my body and my American Express card and told me that, even though my wife would be really mad that I spent this much money on a UNIX book, things would be all right in the long run.

I haven't been able to put it down. It reminds me of the days when computers used to be fun. Thanks!

—Harry Smith

continued on page 56 ►

► OUR MISTAKE

Apologies to Linda Mui, for failing to list her in the last issue as coauthor (with Valerie Quercia) of *X User Tools*. See her article on *xrolodex* on page 61 of this issue.

► OOPS, AGAIN!

We inadvertently dropped a couple of lines of text from the first column of page 13 in the last issue, which led to some confusion. Thanks to those who pointed out our mistake. The missing text, from the article "Developing Software for a Book Publishing Market," goes like this:

"The book helps readers manage their code in multi-person, multi-platform development environments. It does this in two ways. First it identifies most of the issues and tradeoffs. . ."

► FYI

A lot of folks have asked us why our book-and-CD/disk packages, such as *Encyclopedia of Graphics File Formats* and *Multi-Platform Code Management*, have back covers that are about 1/4" short, leaving exposed pages. According to Sue Willing in our production department, the reason is mechanical. These books have "gatefold" back covers; that is, there's an extra flap folded over to protect the electronic media. After a book has been bound, it makes a final pass through a trimmer that trims all four sides, giving a uniform, clean edge all around. If the fold in a gatefold cover were aligned with the book pages, it would get trimmed off, leaving the protective gate unattached. It needs to be recessed at least 1/4" because there's about 1/8" sway in how accurate the trimmer can be.

How to Contact Us

To respond to *ora.com*'s content
(correspondence may be edited for clarity and length):

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O'Reilly products:

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To order books online, and for ordering questions:

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If you have comments or suggestions about our online
Gopher service:

gopher@ora.com

For GNN subscription information:

info@gnn.com

For information about O'Reilly audiotapes:

audio@ora.com



Publisher: Tim O'Reilly

Managing Editor: Barbara Yoder

Contributing Authors & Editors: Adrian Nye, John Perry Barlow, Dale Dougherty, Brian Erwin, David Flanagan, Russ Jones, Don Libes, Mike Loukides, Linda Mui, Andy Oram, Tim O'Reilly, Deborah Russell, Mike Sierra, Stephen L. Talbott, Barbara Yoder

Advertising Director: Brian Erwin

Art Director: Judy Anderson

Designers: Lesley Strother, Ted Meister, Larry Watson, Celinda Bormeth

Cover: Rick Helf Cover Photo: Frank Van Deren Coke

Illustration: Rick Helf

Production: Nels Berthold, Susan Wattell, Lisa Martin

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Sys Admin

AS MORE AND MORE BUSINESSES

and organizations gear up to get online, practical information on setting up Internet services becomes more and more vital. Our new book, *Managing Internet Information Services*, is the first comprehensive guide to creating and maintaining Internet services. With this book, a suitable computer, an Internet connection, and sys admin support, *anyone* can become an Internet publisher. Here we cover clickable image maps, one of the hottest features a Web service can offer.

We also want to know what *you're* doing to solve common problems with Internet use. That's why we're soliciting original tips, tricks, programs, and scripts for an upcoming book. Check out the details on our competition for the best Internet tools. You could become an O'Reilly author.

Expect to be delighted with our new book, *Exploring Expect*, which tells how to use this Tcl-based toolkit to automate interactive applications. Everyone from 3Com, IBM, and HP to The National Cancer Institute and The Baha'i World Centre uses Expect to streamline information processes, automate file transfers, improve quality assurance, and more.

CREATING CLICKABLE IMAGE MAPS By Russ Jones

Managing Internet Information Services, our new guide for UNIX system administrators, describes in detail how to set up Internet servers for World Wide Web, Gopher, FTP, Finger, Telnet, WAIS (Wide Area Information Services), and email services. This article, excerpted from the book, offers concrete guidelines for using clickable image maps in your Web server. ▼

Let's say you want people to be able to get their local weather from your Web server. What would be better than to show them a map of the country (inline) and allow them to click on any location to get that location's weather? That's what a clickable image map does. It has many other uses. For example, it helps users better understand a picture or diagram by allowing them to click on a component represented in the graphic to see an explanation. It also lets users move down to finer levels of detail on a map of a campus or building.

Clickable image maps obviously work only with graphically oriented Web browsers. You should always try to provide alternate text-based methods of accessing the same information.

There are several well-defined steps you need to take when creating a clickable image map:

- Get an image and figure out where to put the *hotspots* (the areas that trigger links).
- Develop an image map file that describes where each hotspot is located and specifies the URL associated with each hotspot.
- Tell your Web server how to reach the image map file.
- Reference the image map in HTML.
- Test the clickable image map.

Let's take a look at each of these steps in detail.

PLANNING THE CLICKABLE IMAGE MAP

First determine the inline image you will use. As for any inline image, the graphic needs to be in GIF format for widest portability. Most graphics service bureaus can scan photographs to create GIF files, or you can draw the graphic with a paint program.

Then rough out mentally where you will place the hotspots. Let's take a look

at an example—a photo of my office. I'm going to use this as the basis for creating a virtual office. With the blurring between the physical world we live in and the virtual online world found on the Web, I should be able to have some fun with this photo.

Arbitrary rectangles, polygons, and circles can be used to identify the hotspots. The photo below shows how the *hotspots* in this image are conceptualized. I can directly hyperlink some of the physical things found in the photo to their virtual equivalents found out on the Web. For example, I placed a copy of *Wired* magazine on my table. I can

be returned if someone clicks on that area. You can include comment lines by beginning the line with the pound (#) sign.

Hotspots are formatted as:

```
shape URL coordinate-1,
coordinate-2 ... coordinate-n
```

where shape is one of the following:

circle—for a circle (with two coordinate pairs: center and any edgepoint)

poly—for a polygon (with at most 100 vertices; each coordinate is a vertex)

rect—for a rectangle (with two coordinate pairs; upper-left and lower-right)

Coordinates are x,y pairs counting in pixels from the upper left-hand corner of the image.

```
poly /map/books-on-table.html
0,375 0,436 45,413 46,380

poly /map/t.html 0,395 0,467 155,
458 230,436 273,401 225,
371 153,364 67, 372

rect /map/stereo-speaker.html
221,90 268,140

poly /map/wall-picture.html 167,0
171,89 226,96 263,0
```

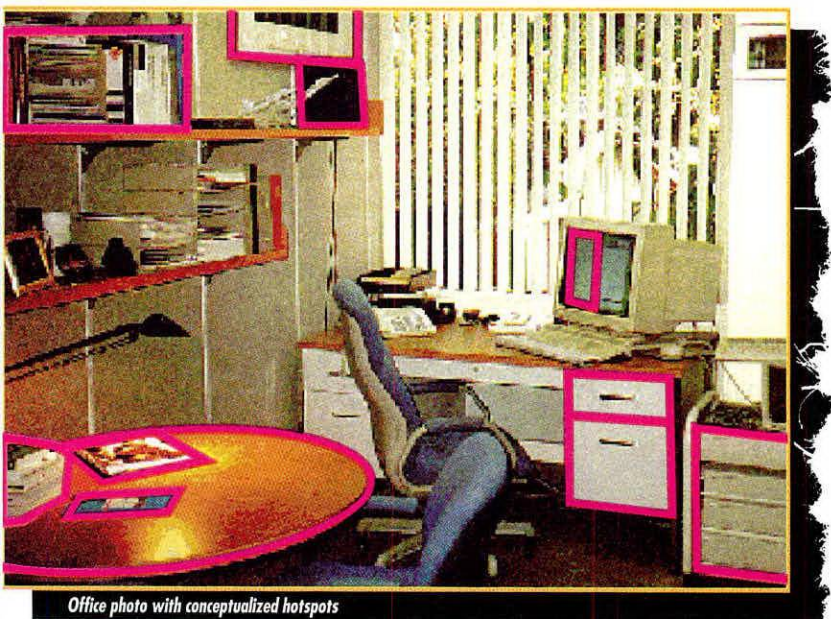
The server takes the coordinates from a user's mouse click and steps through the map file to determine if the click is within any hotspots. As soon as the first match is found, the corresponding URL is used to redirect a document to the user's Web browser. If no matches are found, a default URL (that you specify in the image map file) is returned. There can be only one default per map file.

It is normal to mix and match circles, multiple polygons, and assorted rectangles in the same map file. Although you should try to minimize overlapping hotspots in the image map, if there are any, the first match is the one used. Just make sure they are ordered the way you want them.

How do you determine the x,y pixel coordinates to go into each entry? One way is to use a program like *xv* to view the image and then just click on the graphic to get the coordinates needed according to the shape you want to use for each hotspot.

Note that all the URLs given in the map file are HTML files, not graphic files, even though some of them actually display pictures. I could have had the URL for the photo on the wall point directly to a GIF file of that photo, but I didn't. That would have made the assumption that the user has an external viewer capable of handling GIF files (because only graphics invoked from within HTML documents are shown inline). Instead, I have each hotspot point to an *html* file. Then each *html* file handles the graphic as an inline image.

For default URLs (for when someone clicks on a spot that isn't hot), I return an error message along with a smaller version of the same photo of my office but with the hotspots marked. Actually, it's a lot like the photo below. Don't return a complicated graphic that says only "sorry; try again." On a slow link, the error message/graphic can take quite a



Office photo with conceptualized hotspots

establish a hyperlink from the magazine in the photo to *Wired* magazine's Web server. Where virtual equivalents don't exist, I can create them.

Which shapes should be used depends on what your graphic represents:

- A map of an office floor plan might represent each office as a rectangle.
- A map of a class photo might represent each person's head as a circle.
- A map of a jet plane might represent the jagged outlines of the wing or a tail section as a series of polygons.

MAPPING THE HOTSPOTS IN A MAP FILE

The second step is to develop an image map file. You will need to create a separate image map file for each clickable image map on your Web server.

Each line in an image map file defines a hotspot, by defining an area within the graphic and the corresponding URL to

The URL can be either an actual URL pointing to any resource on the World Wide Web or a URL on your server but without the `http://hostname`.

Let's look at the image map that I put in the file *office.map*:

```
default /map/none.html

poly /map/upper-right-drawer.html
423,319 423,352,499,359,499,326

poly /map/lower-right-drawer.html
423,352,422,416 498,425 499,359

poly /map/home-page.html 425,
220 419,226 442,271 447,222

poly /map/workstation.html 519,364
517,460 633,478 638,376

rect /map/bookshelf.html
0,60 139, 143

poly http://www.wired.com/ 51,357
77,393 144,385 115,365

poly http://nearnnet.gnn.com
/gnn/gnn.html 55,413 46,429
120,425 126,410
```


while to retrieve and be frustrating when the user sees that the graphic it took 30 seconds to retrieve wasn't what he

wanted. Or use a simple text error message if the default is an error.

CONNECTING YOUR MAP FILE TO A URL

The next step ties your map file to the map name that you will use in your HTML. The

You can place map files anywhere you want to on your server. You may want to keep the map files for one server all logically together in the same *map* directory or you may want to encourage individuals to keep the image map together with the image and any supporting HTML documents in the same directory structure.

REFERENCING YOUR CLICKABLE IMAGE MAP IN HTML

The final step in creating an image map is to tell the Web browser accessing the HTML document that the inline image it will display is a clickable image map.

TESTING THE IMAGE MAP

Now if the magic works, the image map should be working. First open the URL of the document containing the HTML just shown. An inline image, like the one shown above, should appear in the browser.

Now if you click on the bookshelf on the left wall of the office, that brings up a bibliography of the books on the shelf, and clicking on one of the books retrieves information about the book from the publishers' Web servers.

HOW IT REALLY WORKS

imagemap is a precompiled gateway that is included in the *cgi-bin* directory with the Web server distribution.

Here's how an image map actually works. When the user clicks on the image, it triggers the link, which makes the Web server invoke the *imagemap* program, passing it the map name. The *imagemap* program opens *imagemap.conf* and uses the map name to get the right map file. Then it opens the map file and searches for the first hotspot that matches the button click. When it finds one, it returns the matching URL.

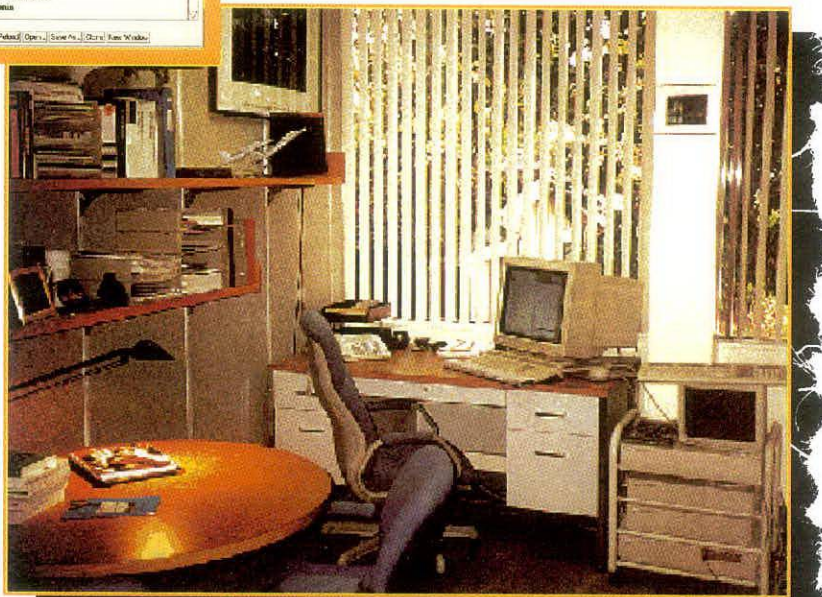
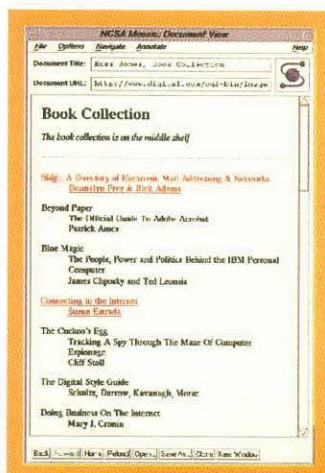
If you have changed the default directory where the *imagemap.conf* configuration file is kept to anything other than */usr/local/etc/httpd/conf*, then you will need to change the *imagemap.c* source and recompile it to reflect where the *imagemap.conf* file is actually located.

Once you understand how image maps work you realize the performance implications. Two files are opened and read for every click on an image map. There is also some processing to determine which hotspot matches the click. So image maps are not free, and you should take care to keep *imagemap.conf* and your map files as short as possible. ■

Russ Jones is the Internet Program Manager responsible for how Digital Equipment Corporation uses the Internet as a communications and publishing tool. He led the development of one of the first large commercial servers on the World Wide Web.

Excerpted from:
Managing Internet Information Services: World Wide Web, Gopher, FTP, and more

*By Cricket Liu, Jerry Peek, Russ Jones, Bryan Buus & Adrian Nye
1st Edition December 1994 (est.)
400 pages (est.), ISBN 1-56592-062-7
\$29.95 (est.) See catalog page 24 for details.*



The virtual office clickable image map on screen

imagemap.conf configuration file contains a list of all your server's map file locations and their corresponding names. It is usually found in the conf directory in your Web server root directory. In *imagemap.conf*, lines beginning with a pound sign (#) are comments. Every other nonblank line is an entry that consists of:

name: path

where

name is the map name and *path* is the absolute path to an image map file, or a relative path from the web server root directory. In the example we have used so far, you would include the following map entry in *imagemap.conf*:

office: /map/office.map

The *imagemap.conf* file is not loaded when you start your *httpd* server. It gets reloaded every time someone clicks on a clickable image map.

This is done by adding the optional ISMAP qualifier to the tag:

```
<IMG SRC="URL" ISMAP>
```

In practice what you do is create a link where this image is the link trigger and the URL invokes the *imagemap* script and passes it the map name:

```
<A HREF="/cgi-bin/imagemap/map-name">
```

```
<IMG SRC="URL" ISMAP></A>
```

I'll explain how this actually works in a moment. But all you really need to know is to use exactly this HTML, substituting your map name (from before the colon in *imagemap.conf*) and your URL. In this example, you would reference the virtual office image map with the following HTML:

```
<A HREF="/cgi-bin/imagemap/office">
```

```
<IMG SRC="/map/office.gif" ISMAP></A>
```


Those Programs Are

Painful

By Don Libes

Expect is a program to control interactive applications. These applications interactively prompt and expect a user to enter keystrokes in response. By using Expect, you can write simple scripts to automate these interactions. And by using automated interactive programs, you will be able to solve problems that you never would have even considered before. In this article Don Libes, the author of Expect, gives a quick overview of some of the things you can do. ▼

fsck, the UNIX file system check program, can be run from a shell script only with the *-y* or *-n* options. The manual defines the *-y* option as follows:

"Assume a yes response to all questions asked by fsck; this should be used with extreme caution, as it is a free license to continue, even after severe problems are encountered."

The *-n* option is safer, but almost uselessly so. This kind of interface is inexcusably bad, yet many programs have the same style. *ftp*, a file transfer program, has an option that disables interactive prompting so that it can be run from a script. But it provides no way to take alternative action should an error occur.

Expect is a tool for controlling interactive programs like these. It solves the *fsck*

problem, providing all the interactive functionality noninteractively. However, Expect is not specifically designed for *fsck*, so it can handle errors from *ftp* as well.

The problems with *fsck* and *ftp* illustrate a major limitation in the user interface offered by shells such as *sh*, *csh*, and others (which I will generically refer to as "the shell" from now on). The shell does not provide a way of reading output from and writing input to a program. This means a shell script can run *fsck*, but only by missing out on some of its useful features. Some programs cannot be run at all from a shell script. For example, *passwd* cannot be run without a user interactively supplying the input. Similar programs that cannot be automated in a shell script are *telnet*, *crypt*, *su*, *rlogin*, and *gdb*. A large number of application programs demand user input.

Expect was designed specifically to interact with interactive programs like these. An Expect programmer can write a script describing the dialogue. Then the Expect program can run the "interactive" program noninteractively. Expect can also be used to automate only parts of a dialogue, since control can be passed from the script to the keyboard and vice versa. This allows a script to do the drudgery and a user to do the fun stuff.

A VERY BRIEF OVERVIEW

Expect programs can be written in C or C++, but are almost always written using Tcl (pronounced "tickle," or, if you're uncomfortable using this particular word in a formal setting, "tee cee ell"). Tcl is an interpreted language that is widely used in many other applications. If you already use a Tcl-based application, you will not have to learn a new language for Expect.

Tcl is a very typical-looking shell-like language. There are commands to set variables (*set*), control flow (*if*, *while*, *foreach*, etc.), and perform the usual math and string operations. Of course, UNIX programs can be called (*exec*).

Expect is integrated on top of Tcl and provides additional commands for interacting with programs. Expect is named after the specific command which waits for output from a program. The *expect* command is the heart of the Expect program. The *expect* command describes a list of patterns to watch for. Each pattern is followed by an action. If the pattern is found, the action is executed.

For example, the following fragment is from a script that involves a login. When executed, the script waits for the strings "welcome," "failed," or "busy" and then

it evaluates one of the corresponding actions. The action associated with *busy* shows how multiple commands can be evaluated. The *timeout* keyword is a special pattern that matches if no other pattern matches in a certain amount of time.

```
expect {
    "welcome"      break
    "failed"      abort
    timeout      abort
    "busy" {
        puts "busy"
        continue
    }
}
```

TOTAL AUTOMATION

Earlier I mentioned some programs that cannot be automated with the shell. It is difficult to imagine why you might even want to embed some of these programs in shell scripts. Certainly the original authors of the programs did not conceive of this need. As an example, consider *passwd*.

passwd is the command to change a password. The *passwd* program does not take the new password from the command line. Instead, it interactively prompts for it—twice. Here is what it looks like when run by a system administrator. (When run by users, the interaction is slightly more complex because they are prompted for their old passwords as well.)

```
# passwd libes
Changing password for
libes on thunder.
New password:
Retype new password:
```

This is fine for a single password. But suppose you have accounts of your own on a number of unrelated computers and you would like them all to have the same password. Or suppose you are a system administrator establishing a thousand accounts at the beginning of each semester. All of a sudden, an automated *passwd* makes a lot of sense. Here is an Expect script to do just that—automate *passwd* so that it can be called from a shell script.

```
spawn passwd [lindex $argv 0]
set password [lindex $argv 1]
expect "password:"
send "$password\r"
expect "password:"
send "$password\r"
expect eof
```

The first line starts the *passwd* program with the username passed as an argument. The next line saves the password in a variable for convenience. As in shell scripts, variables do not have to be declared in advance.

In the third line, the *expect* command looks for the pattern "password:". *expect* waits until the pattern is found before continuing.

After receiving the prompt, the next line sends a password to the current process. The *\r* indicates a carriage-return. (Most of the usual C string conventions are supported.) There are two *expect-send* sequences because *passwd* asks the password to be typed twice as a spelling verification. There is no point to this in a noninteractive *passwd*, but the script has to do it because *passwd* assumes it is interacting with a human who does not type consistently.

The final command, "expect eof," causes the script to wait for the end-of-file in the output of *passwd*. Similar to *timeout*, *eof* is another keyword pattern. This final *expect* waits for *passwd* to complete execution before returning control to the script.

Take a step back for a moment. Consider that this problem could be solved in a different way. You could edit the source to *passwd* (should you be so lucky as to have it) and modify it so that, given an optional flag, it reads its arguments from the command line just the way that the Expect script does. If you lack the source and have to write *passwd* from scratch, of course, then you will have to worry about how to encrypt passwords, lock and write the password database, etc. In fact, even if you only modify the existing code, you may find it surprisingly complicated code to look at. The *passwd* program does some very tricky things. If you do get it to work, pray that nothing changes when your system is upgraded. If the vendor adds NIS, Kerberos, shadow passwords, a different encryption function, or some other new feature, you will have to revisit the code.

PARTIAL AUTOMATION

Expect's *interact* command turns control of a process over to you, so that you can type directly to the process instead of through *send* commands.

Consider *fsck*, the UNIX program I mentioned earlier which checks file system

consistency. *fsck* provides almost no way of answering questions in advance. About all you can say is "answer everything yes" or "answer everything no."

The following fragment shows how a script can automatically answer some questions differently than others. The script begins by spawning *fsck*, and then in a loop answering yes to one type of question and no to another. The ** prevents the next character from being interpreted as a wildcard. In this example, the asterisk is a wildcard but the question mark is not and matches a literal question mark.

```
while 1 {
    expect {
        eof {break}
        "UNREF FILE*CLEAR\?" {send "y\r"}
        "BAD INODE*FIX\?" {send "n\r"}
        "\\? " {interact +}
    }
}
```

The last question mark is a catchall. If the script sees a question it does not understand, it executes the *interact* command, which passes control back to you. Your keystrokes go directly to *fsck*. When done, you can exit or return control to the script, here triggered by pressing the plus key. If you return control to the script, automated processing continues where it left off.

Without Expect, *fsck* can be run non-interactively only with very reduced functionality. It is barely programmable and yet it is the most critical of system administration tools. Many other tools have similarly deficient user interfaces. In fact, the large number of these is precisely what inspired the original development of Expect.

The *interact* command can be used to partially automate any program. Another popular use is for writing scripts that *telnet* through a number of hosts or front-ends, automatically handling protocols as encountered. When they finally reach a point that you would like to take over, you can do so. For example, you could browse through remote library catalogs this way. Using Expect, scripts can make a number of different library systems seem like they are all connected, rather than different and disconnected.

Intelligently managing interactive programs has been a long-standing problem, traditionally solved by avoidance. Yet the number of interactive programs grows daily and shells have not changed to address this. In contrast, Expect solves these problems directly and with elegance. Expect is a welcome addition to the UNIX workbench. ■

Don Libes is a computer scientist at the National Institute of Standards and Technology, where he is working on research related to interaction automation. Libes has written more than 85 papers and articles on computer science and is the author of three books: Exploring Expect (O'Reilly & Associates), Life with UNIX (Prentice Hall), and Obfuscated C and Other Mysteries (Wiley).

Excerpted from:
Exploring Expect: A Tcl-based Toolkit for Automating Interactive Programs

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See catalog page 25 for details.*

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Linux is one of the most exciting developments today in the UNIX world—and some would say in the world of the PC-compatible. Based on a kernel developed by Finnish student Linus Torvalds, Linux is now a complete UNIX-compatible operating system, distributed on the Net or on low-cost disks along with a complete set of libraries, popular free software utilities, and traditional layered products like NFS and the X Window System.

O'Reilly & Associates heard about Linux in September 1992. Several of our staff now use it. We have also reviewed and edited some of the books

of hackers at work. The entire operating system was developed by volunteers from many different countries. The documentation, including a full set of manual pages and several guides, is also being assiduously created by volunteers.

The free software concept deserves some explanation, so that you can understand Linux's commercial status. It is under the same General Public License as the GNU software put out by the Free Software Foundation (and the FSF is indeed distributing Linux). This means, among other things, that anyone can get the source code off the Net.

A critical element of the license is that any enhancements to the code also have

remain low because the software is all on the Net for anyone to take (not because anyone is trying to grab market share, as is the case with some commercial software firms).

With such an open method of distribution, the number of Linux sites has been skyrocketing. Matt Welsh of the Linux Documentation Project estimates the number of users to be over 100,000 worldwide. Major CD-ROM vendors each sell an average of 1,000 CD-ROMs a month. More than 80,000 people read comp.os.linux.announce, which makes it the most popular comp.os.* newsgroup and puts it in the top 40 newsgroups on Usenet.

A Network Administrator's Guide to this **Exciting Version of** **Linux!** **By Andy Oram**

produced by the Linux Documentation Project, thus contributing to this valuable public resource. And now we are publishing the first book in a new Linux series: *Linux Network Administrator's Guide*, written for the Linux Documentation Project by Olaf Kirch.

How a Free Operating System Can Thrive

Like many Linux enthusiasts, we see Linux as a return to UNIX's roots. There are certainly other good UNIX systems for personal computers—even ones whose source code is available, like NetBSD and FreeBSD—but something about the rough-and-tumble, open-market style in which Linux was developed makes it an especially interesting example

to come under the license—no one can tweak part of Linux a little and then sell the result without sharing the source code. This means that all improvements to Linux in the future will be shared freely, just as Linux is now. Numerous hackers can change (and are changing) Linux to meet their personal needs. But those that offer their new features with the public generally do so out of a desire to help people, not to make money.

There's nothing wrong with making money per se, though. The companies that sell Linux diskettes or CDs are doing their best to make a profit. Since they are providing a service by bundling the software and providing installation procedures, this is considered a good thing. But the cost of the disks tends to

What and Where Linux Is

The range of software offered with Linux is impressive. A version of the X Window System, XFree86, has been ported. Thanks to people at Carnegie Mellon, who ported the Andrew Toolkit, Linux is capable of multimedia applications. Spreadsheets, games, and a huge number of languages such as Lisp, Smalltalk, Fortran (through an f2c translator), Forth, and Modula-2 are all available.

For C and C++ programmers, Linux is a fine, modern programming environment. Linus Torvalds did his best to make it compatible with POSIX.1. The GNU compilers and debugger provide good development tools, and all the common UNIX libraries exist.

Linux can be downloaded over the Internet for free; two of the most popular sites are tsx-11.mit.edu (/pub/linux) and sunsite.unc.edu (/pub/Linux). (There are many international sites too, unfortunately too many to list here.) The software is also available on diskette and CD-ROM from a number of vendors; look for the Linux Distribution HOWTO, which lists a number of them. There is even a monthly magazine about the Linux world, called *Linux Journal*.

Anyway, it's worth going to the Net to read the basic introductory documents about Linux. These are called the INFO-SHEET and the META-FAQ.

The Network Administrator's Guide

Why would we publish *Linux Network Administrator's Guide*? After all, by agreement with the author, our editorial contributions are going into a free version that is being released on the Net. The overriding reason for our publishing it is that we see it as our kind of book. It's what we'd want to produce if we contracted with an author to write about Linux.

But publication in an attractive, widely distributed volume is also good for the Linux community. It provides a book that many people would like to own and makes the information more widely available. And it lends legitimacy to the fine creation of these hard-working programmers.

The scope of the guide is very broad. It has something to say about all the essential networking software available for Linux.

Topics include:

- Setting up a serial connection
- UUCP
- Routing
- DNS
- mail and News
- SLIP and PPP
- NFS and NIS

Basic introductions to configuring and managing these tools are offered in simple language that doesn't take much previous knowledge for granted. For many configuration tasks you should be able to get everything you need from this book. For complicated tasks, the book will help you get started and you can then more easily understand the detailed FAQs or manual pages that come with Linux. All in all, this is a book for every Linux administrator.

Andy Oram is coauthor of Managing Projects with make and an editor at O'Reilly & Associates. Some of his free-time interests include diversity/human rights and the socially beneficial uses of computers and networks.



Tim O'Reilly

This summer Tim O'Reilly spoke with Olaf Kirch, author of Linux Network Administrator's Guide, about the development of Linux. Olaf graduated from Technische Universität Darmstadt in 1993 with a degree in mathematics and now works part-time as a C/C++ programmer for a company that's producing a UNIX-based CAD/CAM system. He has spent much of the past year and a half tracking changes in the net working code development of Linux.

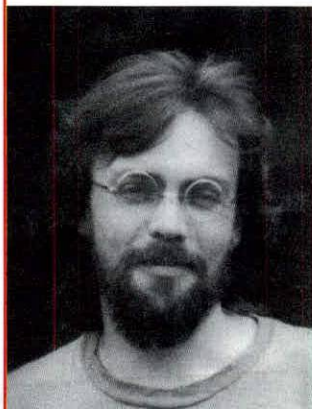
Tim: When we first started hearing about Linux a year or two ago there was a lot of excitement about it in Europe. Why did Linux happen in the first place?

Olaf: Two years ago the time was right for a free UNIX. The Free Software Foundation did a lot of work in preparing the ground for free software and, here in Europe, Linux was rather successful. Linux was published about the time that the first 386 BSD came out.

Tim: How would you compare Linux with some of the free BSD versions for the PC?

Olaf: I don't think you can say one is better than the other. It's a matter of taste. But I think Linux got a real head start over other versions because its development was loose from the very beginning. There were no attempts to

Olaf Kirch



The Wide Appeal of Linux

centralize development. Linus Torvalds coordinated everything, and he let people do what they wanted. In the end he decides what comes into the mainstream kernel and he's very good at that. I think this free development style was what made Linux so attractive to a lot of people.

Tim: So even though the BSD software is free, its development was more controlled because of the licensing restrictions. Basically Linux was a wide open field—a little bit like the Internet in the sense that people could do whatever they wanted and yet have it come together.

Olaf: Yes.

Tim: Is there kernel work going on in the Linux community, or does Linus do most of it himself?

Olaf:

Quite a number of people are doing kernel hacking. Part of the appeal of

with Tim O'Reilly and Olaf Kirch

Linux is that it's so freely accessible and the support for kernel hacking is really good. If you have questions about the kernel, you just get on the mailing list and you'll get quite a bit of support from more advanced kernel hackers.

Tim: What do you see as the real attraction of Linux, other than the fact that you get to play?

Olaf: It's cheap. You can get a complete Linux system on your home PC for next to nothing with a very good software base and more exciting things coming up soon.

For instance, people are now working on adding support for iBCS (Intel Binary Compatibility Specification), which defines a generic system-call interface for applications running on Intel platforms. This allows people to run SCO and SVR4 applications on top of Linux. At the Heidelberg Conference they had some demos for WordPerfect and a spreadsheet called XF, which were very impressive.

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Tim: So, basically, Linux is going to become a substrate on which you could run these commercial applications. How does SCO feel about that?

Olaf: I don't know. There are rumors that some people at SCO use Linux for development work.

Tim: What other exciting things are coming up in the Linux world?

Olaf: Another project is the Linux idea of WABI called Wine, which is still under development. About 40 percent of Windows API functions are now supported. In the beginning, they ran into some problems with portions of Windows that are undocumented.

Tim: I imagine documentation is also a problem in Linux. It must be hard to keep up with all of the people who are writing Linux code and changing things.

Olaf: It is. I've been tracking the networking code development for about a year and a half now, and whenever I thought I had a version of the network administrator's guide finished, everything was totally changed from the bottom up and I had to start over. The reason was that all networking code in the Linux kernel was written from scratch and has been reorganized several times. With the 1.0 kernel release, things have settled down quite a bit. I don't expect major changes in the TCP/IP department in the near future.

Tim: In your book you talk about Linux's support for everything from UUCP to real Internet networking. Do you have a sense of how many Linux systems are actually on the Internet versus using the UUCP for networking?

Olaf: I would guess that quite a number of machines in university departments and in companies are on the Internet directly. I know some people use Linux boxes to do their Internet uplink through an ISDN link or something similar. This trend will intensify in the future, especially here in Europe where ISDN is replacing the old modem connections for Internet access and mail transfer in private organizations.

Tim: You can run UUCP over ISDN as well as TCP, I assume.

Olaf: Yes, you can.

Tim: Are people switching to TCP over ISDN?

Olaf: It depends. At the site where I get my news, they're planning to get an ISDN link and will keep it open 24 hours a day. But many people can't afford a permanent connection so they will probably run UUCP over ISDN.

Tim: What about support for dial-up SLIP or PPP on a part-time basis? Does that work pretty well under Linux?

Olaf: Yes, it does. You can't run a high-volume networking link through it, but it works well if you want to do interactive work or FTP or things like that. It allows you to do several things at once, which you can't do if you just log into a computer terminal.

Tim: Is there any work going on to port Mosaic or World Wide Web servers to Linux?

Olaf: Mosaic is already running on Linux. The problem that many Linux users have with Mosaic is Motif code. For instance, not many students have the Motif development kit on their systems, because it costs quite a bit to get a Motif license. However, statically linked Mosaic binaries are being distributed.

Tim: But obviously Mosaic and the Web are the most exciting things on the Internet, and Linux is one of the most exciting things in UNIX, so you'd think the two ought to come together at some point.

Olaf: Oh, they do. I've been using Mosaic on Linux for some time now. All I'm lacking is a real Internet connection here at home.

Tim: Do you feel that Linux is robust enough to use as a Web server?

Olaf: Yes. People are doing this and it works quite well. I know a couple of companies that are getting their mail and news via UUCP by a Linux box, and I know some people in noncommercial networks who serve their audience and run an Internet server with FTP, WWW, and couple of other things. It works very well.

Tim: Let me come back to the subject of documentation. *Linux Network Administrator's Guide* is copylefted and therefore presumably could be republished by anyone, yet we're taking the risk of working with you to develop it. We hope that, while it will be copyable, other people won't actually come out and publish competing books. What do you think about that?

Olaf: I think it's bold of you to publish a book like this under an agreement like this, and I'm grateful you're doing it because it's a great service to the Linux community.

Tim: We're really interested in finding out to what extent copyleft and commercial publishing can coexist. We know that we need to make money in order to add value to the production and even to the editorial. I know you got a lot of help from Andy Oram in developing the book and improving it. Those things cost money and, of course, most of the people in the Linux community are students or have other jobs and they're doing it as a labor of love. But at some point you come to the realization that you can get more help if you have a revenue source. The question is: How do you balance that with the desire to make things freely available to people who can't afford it? We're hoping we hit a compromise. Our big concern is that we'll do a lot of work and then have other publishers also publish the book, and people won't necessarily realize the difference—that one party is supporting the effort and the other is just taking from it.

Olaf: I can't guarantee that this won't happen. I know other publishers would face competition as well if they took the networking guide and published it themselves. They probably wouldn't make any money, so why should they? The other point is that there are a lot of people on the network who will print out the networking guide, but a large user base is building up outside the Internet and UUCP-connected networks. You can see that from CD-ROM publishing. There are a dozen or more CD-ROM publishers in the U.S. alone, and quite a number in Germany, and they're making a profit.

Tim: I know one version of Linux is available on CD-ROM. Do you have a personal preference among the various Linux releases that are available?

Olaf: Well, my first Linux installation was stuck together from various parts. A disk crash recently killed my hard disk, so I had to reinstall and I chose to use Slackware. I can't tell you why I used Slackware but it worked out for me. It's easy to install and I didn't have much headache with it. In every Linux distribution, you have a few quirks that you have to fix manually sooner or later.

Tim: How different are the various distributions?

Olaf: I think the basic components are present in all distributions. It's just a matter of how much attention the distributors pay to important details. There are some very sloppily made CD-ROMs on the market with next to no documentation and quite a number of bugs in them.

Tim: What do you think about the role of support and documentation in Linux's growth? For example, there's Cygnus Support, a U.S. company that offers paid support for GNU software. Do you see a role for a company like this to take on more of Linux?

Olaf: Yes, I think it's beginning to happen. There are now a few consultants who offer advice on installing and running Linux. I've even taken support calls from people in various companies; I think they didn't know who else to call. But, in general, when a company knows that support is available through a paid service, they'll probably feel more secure about using Linux.

Tim: Is there a formal relationship between the Linux community and the Free Software Foundation?

Olaf: There will be an official FSF/Linux distribution on CD-ROM called Debian Linux. Someone at the FSF approached us at the Linux Documentation Project about turning our books into something more general. He wanted to use texinfo and didn't want to focus on just Linux. I didn't feel up to the job at the time.

Tim: Do you tend to think of Linux as more of a System V-like system or closer to Berkeley or is it something else entirely?

Olaf: Linux started out closer to System V, and it has System V extensions, but at the kernel level they are trying to implement the Posix standard. FreeBSD seems to be moving in the same direction recently, from what I've heard.

Tim: What do you see as the most important things that Linux needs to become even more exciting and fully featured?

Olaf: End user applications are critical. People won't be happy forever hacking things or just reading their news on Linux. Users want word processors and spreadsheets, and they don't want to be bothered with system administration. Better distribution is coming, especially for people who want to plug and play.

Tim: But applications have always been a weak point of free software. It tends to be aimed more at programmers than at nonprogrammer users.

Olaf: Yes, but I think this is changing now. Several commercial software houses are porting their applications to Linux. One that I saw at the Heidelberg Conference was Maple, a mathematical package that is widely used in universities. This will add value to Linux for people in academia. And I think other companies are likely to follow suit.

Tim: What's your vision of the future of Linux? How do you think it will develop in years to come?

Olaf: I think Linux will soon start moving away from the status of a developer's system. I expect it to become more and more attractive to nonprogrammers as iBCS and Wine become available and companies start porting their applications to Linux. In the networking arena, we're looking forward to support for Novell's Network protocols.

I believe Linux will continue to evolve. Some people dream of Linux replacing DOS and MS Windows one day; this is probably a little too optimistic, but I think it will gain quite a number of followers as it matures.

Tim: What are your hopes for *Linux Network Administrator's Guide*?

Olaf: I hope it will find its way to the people who are facing the task of bringing their Linux boxes on a network, and spare them hours of sifting through manpages and READMEs. I'm confident that having a printed version from O'Reilly will greatly help this.

“Some people dream of Linux replacing DOS and MS Windows one day; this is probably a little too optimistic, but I think it will gain quite a number of followers as it matures.”

Internet

WE'RE OUT TO MAKE NAVIGATING

the Net an easy, enjoyable, rewarding experience. So we're offering a continuum of products and services to meet the needs of Internet novices and experts alike.

Our new *Mosaic Handbook*, available in Microsoft Windows, Macintosh, and X Window System editions, provides everything you need to take advantage of the information browser that's changing the face of the Internet. The book comes with an easy-to-install, commercial version of Mosaic, along with a subscription to the Global Network Navigator (GNN®). If you already have an Internet connection, this is the guide for you.

If you're not already connected to the Net, take a look at *Internet In A Box™*, which features a commercial version of Mosaic, a subscription to GNN, a special edition of *The Whole Internet User's Guide*, a full suite of powerful applications, and easy, automated Internet access that makes connecting to the Net a super-simple operation.

Of course, we're busy every day updating GNN, evaluating new Net services, and improving our interface so that you can find your way to the best resources on the Net. GNN's Best of the Net awards honor some of the most innovative services out there.

Getting^{the}

I always enjoy giving demos of Mosaic and showing people interesting places to go on the Internet. At trade shows or in boardrooms, whether there's one person or many looking over my shoulder or viewing it on a big screen, I watch to see when they "get" it. When do they really understand the power of Mosaic? When do they really see what the Internet makes possible? When do they realize that Mosaic lets them do things they always wanted to do with a computer?

When Mosaic appears on the screen I usually distinguish between the Mosaic interface and the document that is displayed. I explain that when I use the scrollbar, which Mosaic provides, everything that moves is in the document window, where formatted documents containing text and graphics are displayed. The document itself contains any number of hypertext links, or connections, to other documents anywhere on the Net. I move the mouse pointer over a link and click on it. Right away, Mosaic begins retrieving the document from a remote information server.

Then I stop and explain that the document I just retrieved came from Geneva, Switzerland. Usually, someone smiles. Next I get a document from a server in Australia and yet another from a university in Texas. At that point, someone usually asks a question to be sure. This gives me the chance to stop and emphasize to the audience that we are traveling great distances across the Internet. Sometimes there actually is a delay in

making a long-distance connection, and then I have the opportunity to make the same point. But often enough the document pops up on the screen just as if it were on my local system. "Did you see that?" I ask. "I just got that document from a World Wide Web server in Vancouver, British Columbia."

Mosaic makes it easy to navigate the Internet, and the connections are transparent to the user. I begin to worry that the audience might not grasp the power behind such a simple interface. For that reason, I tell them briefly about the World Wide Web.

THE WORLD WIDE WEB

While Mosaic manages the user interface and the display of documents—in other words, what is visible to the user—the World Wide Web is invisible. The Web is an information architecture developed at CERN, a particle physics lab in Geneva, Switzerland. It defines the components of a global information system and how they work together. I explain how clients like Mosaic are used to access information servers out on the network. I also explain how the clients and servers talk to each other through the Web protocol specification known as HTTP (HyperText Transfer Protocol).

Web specifications are public, and anyone can follow them to build a client, and there is even code available that takes care of common functions. Indeed, that is how Mosaic was developed at the National Center for Supercomputing

BIG Picture on MOSAIC

By Dale Dougherty

Applications (NCSA) at the University of Illinois. The virtue of public specifications is that, from the outset, the World Wide Web recognized the need to have clients for all platforms, and NCSA has come out with versions of Mosaic for the X Window System, Microsoft Windows, and the Macintosh.

MOSAIC: REDEFINING THE INTERNET

As a graphical browser, Mosaic has managed to redefine what it means to be on the Internet. Instead of typing long command lines and having to remember a lot of arcane details, users can find the best the Net has to offer with a couple of mouse clicks. As if that isn't enough, when I show them that Mosaic can be used for multimedia, they react with disbelief, then with pleasure as they begin to see the future today. "Can you really find sound and video on the Net?" they want to know. "Yes, you can," I tell them. And although it may be impractical today to download digital sound bites or MPEG movie clips, the capability is there, the result can be stunning, and it's worth the wait. As the speed of network connections improve, so much more becomes possible.

Mosaic and the World Wide Web have emerged as the most exciting development in computing in a decade, supplying the infrastructure needed to usher in the Age of Networked Information. Already they are changing how people think and work. More and more people—from elementary school children to

CEOs—are discovering that they can move through the rich landscape of the Internet, find its wealth of resources, and contribute to its growth by becoming information publishers themselves.

Mosaic is redefining what it means to be a publisher. O'Reilly & Associates is exploring this new territory and learning how to serve a new audience of online customers with the Global Network Navigator (GNN[®]), the first commercial publishing application on the Web, launched in 1993. Mosaic is also changing the way businesses distribute information. Companies like Digital and Boeing, for instance, are setting up Web servers to distribute employee handbooks, sales sheets, and policies. Users are creating their own home pages, listing their hobbies or favorite places to visit on the Net.

All in all, the World Wide Web is becoming an incredible, enormous interconnected network of information, public and private, commercial and educational, free and for-pay. If you have an Internet connection, all you need is Mosaic to begin exploring these resources on your own.

Well, maybe that's not all you need. Things are not as easy as they seem in a demo. Knowing where to go and what to do on your own can be challenging, especially given the size of the Internet. Learning how to navigate the Net and keeping up with all the new resources that are added every day is not easy.

continued on page 18 ►



How to Get GNN[®]

GNN is available over the Internet as a subscription service. To get complete information about subscribing to GNN, send email to **info@gnn.com**

If you have access to a World Wide Web browser such as Mosaic or Lynx, you can use the following URL to register online: **http://gnn.com/**

If you use a browser that does not support online forms, you can retrieve an email version of the registration form automatically by sending email to **form@gnn.com**. Fill this form out and send it back to us by email and we will confirm your registration.

That's one reason we created GNN—so that you could find this information online and not have to spend your time gathering it. It's also why we developed *The Mosaic Handbook*, a complete guide to navigating the Internet with Mosaic.

THE MOSAIC HANDBOOK

The Mosaic Handbook is your guide to the strange and fascinating world of hypertext, graphics, sound, video, and all that you will find on the World Wide Web. It's published in three separate editions—for Microsoft Windows, Macintosh, and the X Window System.

The book explains how to use Mosaic instead of traditional Internet tools, such as *ftp* or *gopher*. It also shows how to customize Mosaic and change its behavior or modify the presentation of documents using style sheets.

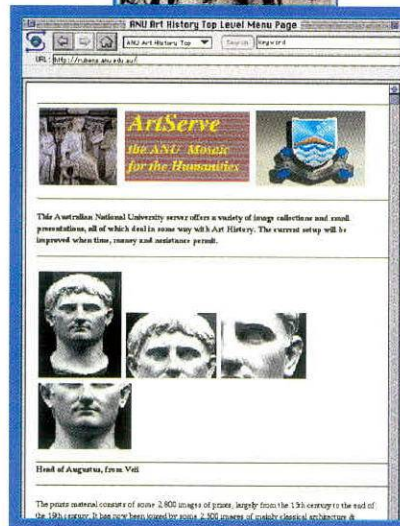
You'll also find a primer on HTML (HyperText Markup Language), which is the format of documents on the Web. You'll learn the basic tag set and then create a home page of your own, complete with links to other servers.

The book comes with a subscription to GNN, which shows what's possible using Mosaic as an information interface, and which makes a great starting point for exploring Web resources. GNN's Whole Internet Catalog describes the best Net servers and allows you to go into them and explore them, simply by clicking on links. GNN's special-interest publications on travel, personal finance, and other subjects contain articles and reviews that help you evaluate Internet resources. They also provide links to services you might not otherwise discover.

Best of all, *The Mosaic Handbook* comes with a commercial version of NCSA Mosaic that offers improved reliability and performance over the version available on the Net. It also contains a custom home page, with links to all the servers mentioned in the book. So if you already have an Internet connection, *The Mosaic Handbook* provides everything you need to easily and expertly navigate the Net. ■

Dale Dougherty is the publisher of *Global Network Navigator* and an editor at O'Reilly & Associates.

For more information on *The Mosaic Handbook* see catalog page 22.



GNN's Best of the Net Awards, presented in June at Internet World, honor twelve of the best destinations on the Internet. Recognized for their contribution to the Internet were a 16-year-old magazine editor, the U.S. Census Bureau, a pair of paleontology graduate students, a group of science fiction fans, an art history professor, the folks at Xerox research labs, and other Internet innovators. We also presented the First Citizen of the Net award to noted author and online visionary Howard Rheingold for his efforts in identifying the democratic role of online communities.

Here's the complete list of recipients, along with their URLs. You can also access these servers through GNN. Happy Net surfing!

ArtServe

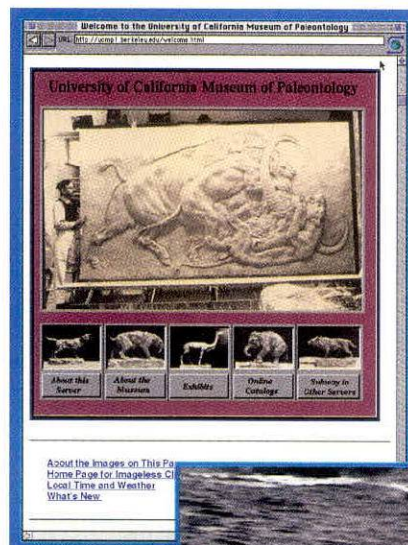
<http://rubens.anu.edu.au/>

At this site you can view 2,800 images of prints, largely 15th century through 19th century, visit the Canberra School of Art, or view images of contemporary Hong Kong architecture. Developed by Professor Michael Greenhalgh at Australian National University.

The Paleontology Server

<http://ucmp1.berkeley.edu/welcome.html>

The University of California Museum of Paleontology server, developed by David Polly and Robert Guralnick, is a well-organized, interactive, natural history museum that makes use of large graphics. Here you can learn about phylogeny (the "Tree of Life") or examine photographs of great white sharks off the California coast.



BEST OF THE NET

The Currency Converter

<http://www.ora.com/cgi-bin/ora/currency>

David Koblas wrote a Perl script to convert currency from one denomination to another. It's an excellent example of how information can be presented interactively: choose the country of interest and you'll see the current rate of exchange with other countries.

Edupage Newsletter

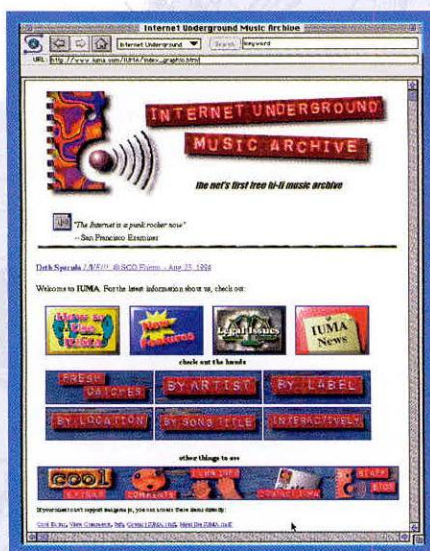
<http://www.ee.surrey.ac.uk/edupage/edupage/>

This newsletter summarizes printed news coverage of interest to Internet leaders and citizens. It's published by Educom, a nonprofit consortium of higher education institutions that seek to transform education through information technology.

Internet Underground Music Archive

<http://www.iuma.com/>

Developed by U.C. Santa Cruz students Robert Lord and Jeff Patterson, this archive intends to apply the principles of free software to music distribution. It goes beyond the limits of what's defined as commercially viable by promoting obscure bands. It includes sound clips.



International Teletimes

http://www.wimsey.com/teletimes.root/teletimes_home_page.html

This general-interest magazine seeks to present informed opinion and observation drawn from the experience of living in a particular place. Editor-in-Chief Ian Wojtowicz is sixteen years old. Ian has one more year left in high school, but he's spending a significant amount of time growing up on the Net.

Science Fiction Resource Guide

<ftp://gandalf.rutgers.edu/pub/sf1/sf-resource.guide.html>

At this site you can discover the nominees and winners of the Hugo awards; access science fiction-based books, movies, television, awards, trivia, and conventions; and explore Star Trek trivia. It's maintained by Gareth Rees.

Taxing Times

<http://www.scubed.com:8001/tax/tax.html>

Presented as a public service by Maxwell Labs, Taxing Times is a repository of tax forms including many IRS publications online. It is perhaps a comfort to some that this server is not owned and operated by the IRS. William J. Proffer maintains the service.

New Zealand Information

<http://www.cs.cmu.edu:8001/Web/People/mjw/NZ/MainPage.html>

Located at Carnegie-Mellon and maintained by Michael Witbrock, this server provides access to a wealth of data about New Zealand, including climate forecasts, speeches in the native Maori language, and information on the most ancient of all living reptiles, the Tutarā.

US Census Information Server

<http://www.census.gov/>

The Census Bureau has created a model server for government agencies to follow. It clearly organizes information so that citizens can make their own use of it. Here you'll find data on state and local governments and schools, poverty in the U.S., housing changes, and more.

Hypertexted USENET FAQs

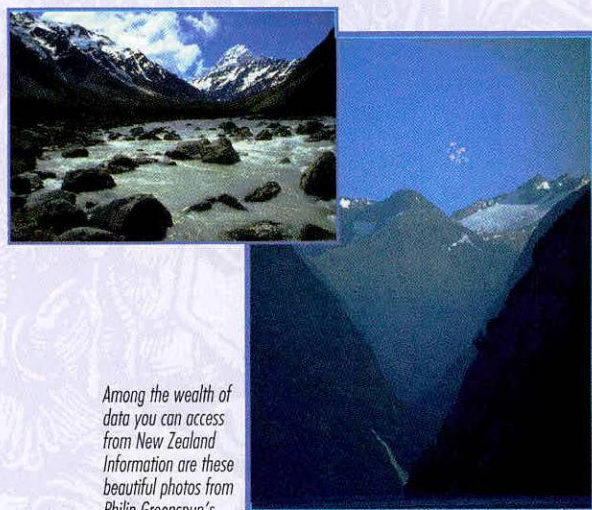
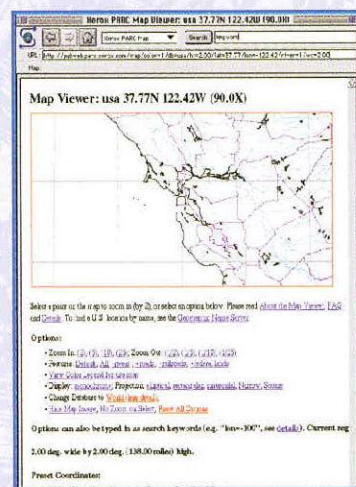
<http://www.cis.ohio-state.edu/hypertext/faq/usenet/FAQ-list.html>

Organized by Thomas Pine of Ohio State University, this server makes the answers to frequently asked questions (FAQs) about the Internet easy for online users to find.

Xerox PARC Map Viewer

<http://pubweb.parc.xerox.com/map>

From the research labs of the people who make machines that make copies, here's one of the most interactive applications on the Net. MapViewer dynamically renders a map based on user input. Click on a region and MapViewer will zoom in on it. You can also use a geographic name server to locate a particular location by name. MapViewer is maintained by Steve Putz.



Among the wealth of data you can access from New Zealand Information are these beautiful photos from Philip Greenspun's New Zealand travelogue at <http://www-swiss.ai.mit.edu/phlg/new-zealand/new-zealand.html>

INTERNET IN A BOX™

An Open Door into the **Ultimate Online Service**

By Barbara Yoder



Internet In A Box is a revolutionary new product designed to provide a simple, elegant solution to Internet access problems for individuals and small businesses without dedicated lines and UNIX machines. Internet In A Box offers easy first-time connectivity from the desktop, makes the tools to navigate the Internet a breeze to use, and features a well-conceived system for organizing the best resources available on the Net—all of which allows you to easily and efficiently mine the vast wealth of Internet resources.

GNN® is like a well-trained library staff helping people to sort through the Internet's myriad resources and access directly the information they seek. Internet In A Box is our simple way of helping people get GNN.

Currently available only for Windows, Internet In A Box embodies the philosophy that complex information problems should have short, simple answers.

The product includes The Global Network Navigator (GNN®), the online information service O'Reilly launched in 1993 as a concise answer to the difficult problem of how to organize and catalog online resources. "The Internet is like a library system with thousands of inter-

connected branches around the world," says Internet In A Box product manager Gina Blaber. "We wanted GNN to be like an interlibrary card catalog system or a well-trained library staff, helping people to sort through the Internet's myriad resources and access directly the information they seek. Internet In A Box is our simple way of helping people get GNN."

Paul Johnson, Internet In A Box development manager at SPRY, Inc. (the Seattle-based internetworking software firm that developed the software), likes to think of Internet In A Box as "an open door into the ultimate online service. The Internet has so much capacity," Johnson says. "It's global in scope. It has multimedia capabilities. We can send integrated text and graphical documents. We can have sound and ultimately video capacities. There's no single place that's hoarding all the data. And it has an open architecture, which means that anybody can play."

ANYBODY CAN PLAY

Internet In A Box opens the door to information access so that anybody can play. This product so easy to use, you need to know only two things to get started using the Internet: how to load software onto your PC and how to use a mouse. Internet In A Box provides TCP/IP access to an Internet provider and contains a complete set of Internet software, customized for Windows. It runs on a 386 system with:

- MS-DOS 3.0 or later
- Windows 3.1 or later

- 4 MB of RAM
- 9600 baud modem or greater
- standard (analog) phone line

That's it. Everything else is in the box, including instant connectivity, the latest information technologies that help you navigate smoothly through the Internet, and a full suite of powerful applications that make the Internet as easy as point and click.

CONNECTIVITY OPTIONS

Internet In A Box uses a unique account set-up protocol that makes TCP/IP access to the Internet a plug-and-play kind of operation. You select a provider, fill out a simple form on your PC, and make the connection. Automated account set-up procedures take over, and you have full Internet access.

The product works with any PPP or dedicated service provider, giving you a dynamic, multimedia Internet connection with on-screen graphics and sound. If you already have a PPP Internet account, you can use Internet In A Box with your existing access provider. If you don't have an account, you can connect via any local access provider who offers PPP accounts. You can also connect via SprintLink™, which offers a 1-800 Internet service you can use from anywhere in the continental U.S., Hawaii, and Alaska. To help you get started, Internet In A Box contains discount coupons for dozens of service providers.

Large sites can use both the single-user version (available now) and a LAN version (forthcoming). For example,

continued on page 53 ▶

o'reilly & associates, inc.

CATALOG

fall 1994



- ▶ 21 New Titles
- ▶ Internet In A Box™
- ▶ MOSAIC Books and Software
- ▶ X CD-ROMs

Fall Catalog

O.R.A.

NEW TITLES

1994

O'Reilly & Associates

As Managing Editor, my job is to see that O'Reilly continues to serve its customers by publishing practical books that let them get their jobs done and still get home at a decent hour.

I came to O'Reilly from a big computer company. The writers and editors there are smart and able, but in the end, documentation is not the top priority for the engineers and product managers who develop the company's products. So it's nice to be at O'Reilly, where the books themselves are the products. Our books have to fill a need because people spend their hard-earned money on them.

We have editors covering the major areas of technical publishing. I try to pull all their work together into a coherent whole. And I want to make sure we cover new important topics when they come along. O'Reilly books fill the gaps in available information, and new gaps appear all the time.

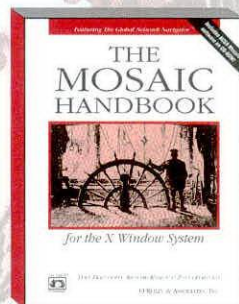
We're covering the World Wide Web, for example, with Mosaic books for Microsoft Windows, the Macintosh, and the X Window System. Expect to see more Internet titles for these platforms.

System administrators manage complex networks now, so we also have offerings for them, like Linux Network Administrator's Guide and Managing Internet Information Services. UNIX stalwarts need not fret, however. We have X User Tools, Motif Programming Tools, The Frame Handbook, and Exploring Expect: A Tcl-based Toolkit for Automating Interactive Programs.

And we're looking for new topics. What have we missed?

—Frank Willison, Managing Editor
O'Reilly & Associates, Inc.

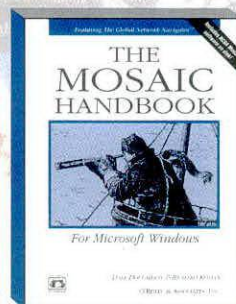
USING THE INTERNET



The Mosaic Handbook for Microsoft Windows

By Dale Dougherty & Richard Koman
1st Edition October 1994
230 pages, ISBN 1-56592-094-5
With two diskettes containing Enhanced NCSA Mosaic V1.0 for Windows

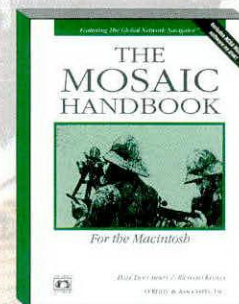
Order Number: 094-5, \$29.95



The Mosaic Handbook for the X Window System

By Dale Dougherty, Richard Koman & Paula Ferguson, 1st Edition October 1994
288 pages, ISBN 1-56292-095-3
With CD-ROM containing NCSA Mosaic for the X Window System, V2.4

Order Number: 095-3, \$29.95



The Mosaic Handbook for the Macintosh

By Dale Dougherty & Richard Koman
1st Edition October 1994
198 pages, ISBN 1-56592-096-1
With diskette containing Enhanced NCSA Mosaic for Macintosh V1.0

Order Number: 096-1, \$29.95

These books introduce you to Mosaic and its use in navigating and finding information on the World Wide Web. Using Mosaic's point-and-click interface, a user can move from document to document, viewing text, graphics, video, audio, or the combination of any of these media, without having to worry about where that information is located. In addition to its interface to the World Wide Web, Mosaic provides a graphical interface to most Internet utilities, like FTP, Gopher, Archie, Veronica, and WAIS. For more advanced users, the books describe how to add external viewers to Mosaic and how to customize the Mosaic interface.

All three books come with a subscription to The Global Network Navigator (GNN®). GNN contains navigational guides that help Mosaic users discover hundreds of Internet resources.

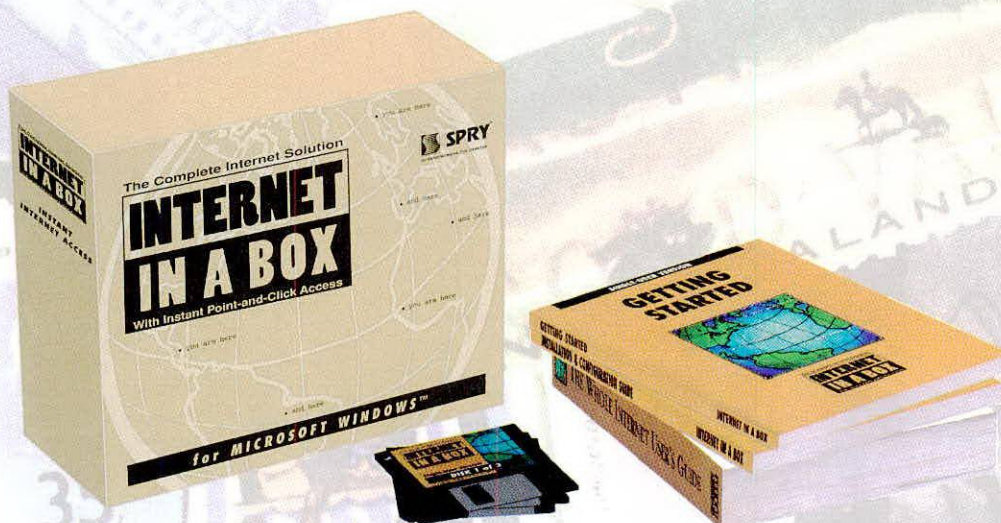
The Microsoft and Macintosh versions come with a copy of Enhanced NCSA Mosaic on diskettes; the X Window version comes with NCSA Mosaic on CD-ROM. Enhanced NCSA Mosaic is based on the original Mosaic developed at the National Center for Supercomputing Applications (NCSA). However, it is not a public domain program, nor is it the same as the versions that can be downloaded

from the Net. Spyglass, Inc. was chosen by NCSA as the master licensee of NCSA Mosaic. Spyglass is committed to maintaining a single code base for all three Mosaic platforms and keeping a consistent interface across all platforms. All three versions should be consistent in their reliability, which has not been true in the versions on the Net. Enhancements to NCSA software include:

- Dramatically faster performance
- Reduced memory requirements—one-half to one-third the memory previously required
- Easier installation
- Support for printing
- Simplified interface for easier browsing
- Support for forms, allowing for two-way communication between users and Web servers
- Proxy gateway support for security in networked environments
- Online help system

O'Reilly fully supports the software and, as new versions become available, we can provide them online to registered users. All three Mosaic books include a single user license.

▶ For an in-depth look at Mosaic, turn to page 16 of *ora.com*.



"Internet In A Box puts everything a user needs to establish a direct Internet connection in one easy-to-use package."

—TIME Magazine, September 1994

Internet In A Box™

Produced by SPRY, Inc.
(Product good only in US and Canada)

Our Mosaic books are for people who already have an Internet connection. Internet In A Box™ is for people who need to start from the ground up. Internet In A Box is the first shrink-wrapped package to provide a total solution for PC users to get on the Internet. Quite simply, it solves Internet access problems for individuals and small businesses without dedicated lines and UNIX machines. Internet In A Box provides instant connectivity, a multimedia Windows interface, a full suite of applications, and a complete online guide to the Internet. This product is so easy to use, you need to know only two things to get started: how to load software onto your PC and how to use a mouse.

The box contains:

- Two ways to connect to the Internet: five-minute automated connection via SprintLink (in continental US, Hawaii, and Alaska) or manual connection to any PPP provider in the US and Canada
- A subscription to the Global Network Navigator (GNN®), an online interactive guide to the Internet
- Software: The Air Series applications, including Mosaic, electronic mail, USENET news reader, drag-and-drop file transfer, Gopher, and Telnet
- Three books that clearly describe how to use these resources: a special edition of Ed Krol's bestselling *The Whole Internet User's Guide & Catalog*, a *Getting Started* guide, and an *Install* guide
- Special money-saving offers from Internet service providers

► For more information on Internet In A Box, see the article on page 20 of *ora.com*.

Order Number: 1100, \$149 list price

A Word About Ordering Internet In A Box

We were worried that heavy demand for this product would overwhelm internet service providers with too many new users all at once so we decided to have a controlled rollout for Internet In A Box.

Internet In A Box will be available only in limited quantities for the next couple of months. You can purchase Internet In A Box from O'Reilly for \$149. If you buy it from a bookstore you may pay a bit less due to discounting. Because of our agreement with Spry, we can't discount this product ourselves.

To order Internet In A Box from O'Reilly, call us at the numbers below or use the enclosed order form.

We receive volumes of mail every day from our customers and vendors: Order forms, inquiries, overnight packages, personal letters, and of course, faxes and email.

Sometimes the mail comes to us in a computer-generated envelope with a postage meter insignia. And sometimes the mail arrives hand-written, emblazoned with gorgeous stamps from around the world. These stamps honor heroes and heroines, castles, artists, writers, seashores, opera houses, and other treasures.

Mary Mayo, the receptionist in our California office, has collected the stamps you see displayed in this catalog. As she says "I like the artwork and it's always interesting to see how a country represents their culture and people. It's like traveling around the world from right here at my desk."

For us, the stamps are another way we get to know the customers we serve around the world. We hope you enjoy them as much as we do.

Fall Catalog

O.R.A.

NEW TITLES

1994

O'Reilly & Associates

CD-ROM

The X Companion CD for R6

1st Edition November 1994 (est.)
CD-ROM plus 80-page guide
ISBN 1-56592-084-8

X11 R6 was released by the X Consortium in May of 1994. New features include the session manager, multi-threaded Xt applications, C++ support, and more. Our new X11 R6 CD-ROM, a companion to our *X Window System Administrator's Guide* (Volume 8 of the *X Window series*), is a helpful resource for system administrators and programmers alike. The CD features:

X11 R6 binaries (compiled and supplied by Ready-to-Run Software) for most major platforms: SunOS on SUN4, Solaris 2, AIX on IBM RS6000, HP-UX on HP700, OSF/1 on DEC Alpha, SCO UNIX, DG Avion, X11 R6 sources and contrib directory, X11 R5 sources and contrib directory, and Source files of the programming examples in our X Window System manuals.

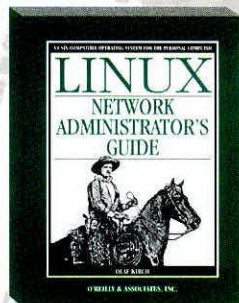
The accompanying booklet shows you how to install the software, briefly discusses new R6 material, and provides a permuted index.

Now you don't have to wait for your vendor's release of the software. It's all here, along with the latest patches from the X Consortium, on this handy CD.

System administrators, please note: X programmers who want to port or test their X applications for Release 6 will want this CD now so that their updated programs will be ready to publish when Release 6 is available as the standard release from vendors.

See page 58 in *ora.com* for an article on important new R6 features. Also see page 27 in this catalog for details about our new "Programmer's Supplement for Release 6".

Order Number: 084-8, \$29.95 (est.)



Linux Network Administrator's Guide

By Olaf Kirch
1st Edition December 1994 (est.)
400 pages (est.), ISBN 1-56592-087-2

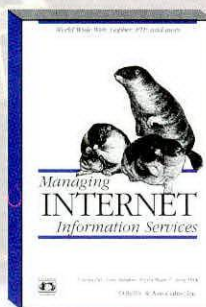
A UNIX-compatible operating system that runs on personal computers, Linux is a pinnacle within the free software movement. It is based on a kernel developed by Finnish student Linus Torvalds and is distributed on the Net or on low-cost disks, along with a complete set of UNIX libraries, popular free software utilities, and traditional layered products like NFS and the X Window System.

Networking is a fundamental part of Linux. Whether you want a simple UUCP connection or a full LAN with NFS and NIS, you are going to have to build a network. This book touches on all the essential networking software included with Linux, plus some hardware considerations. Topics include serial connections, UUCP, routing and DNS, mail and News, SLIP and PPP, NFS, and NIS.

For more information on this book and Tim O'Reilly's interview with Olaf Kirch, see page 12 of *ora.com*.

Order Number: 087-2, \$24.95 (est.)

SysAdmin AND SECURITY



Managing Internet Information Services: World Wide Web, FTP, Gopher, and more

By Cricket Liu, Jerry Peek, Russ Jones, Bryan Buus & Adrian Nye
1st Edition December 1994 (est.)
400 pages (est.), ISBN 1-56592-062-7

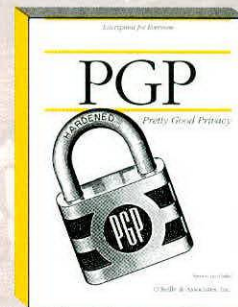
This comprehensive guide describes in detail how to create services for the millions of Internet users. By setting up Internet servers for World Wide Web, Gopher, FTP, Finger, Telnet, WAIS (Wide Area Information Services), or email services, anyone with a suitable computer and Internet connection can become an "Internet Publisher."

Services on the Internet allow almost instant distribution, frequent updates, and any kind of information. You can provide services to employees of your own company, or you can serve the world. Or perhaps you're the Species Survival Commission, and you would like your endangered species Action Plans viewable worldwide. This book tells you how.

Creating a big service can be a big job, involving more than one person. While the whole book is suitable for the UNIX system administrator who will build, run, and maintain the service software itself, parts of it—clearly separated and marked—are designed for the "Data Librarian," the person responsible for creating or arranging the information that the service presents.

See the article by Russ Jones on clickable image maps, page 6 of *ora.com*. Related O'Reilly books: *TCP/IP*, *sendmail*, and *DNS and Bind*.

Order Number: 062-7, \$29.95 (est.)



PGP: Pretty Good Privacy

By Simon Garfinkel
1st Edition December 1994 (est.)
400 pages (est.), ISBN 1-56592-098-8

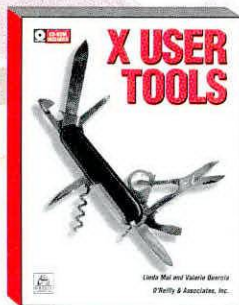
PGP is a free and widely available program that lets you protect files and electronic mail. Written by Phil Zimmermann and released in 1991, PGP works on virtually every platform and has become very popular both in the U.S. and abroad. Because it uses state-of-the-art public key cryptography, PGP can be used to authenticate messages, as well as keep them secret. The ability to protect the secrecy and authenticity of messages is a vital part of being able to conduct business on the Internet.

PGP: Pretty Good Privacy is both a readable technical users guide and a fascinating behind-the-scenes look at cryptography and privacy. Part I, "PGP Overview", introduces PGP and basic cryptography. Part II, "Cryptography History and Policy", is a fascinating, behind-the-scenes look at the development of PGP and cryptography. It describes the program's battles over patents and U.S. government export policies, and it discusses current policies and politics regarding electronic privacy in the US. Part III, "Using PGP", is a complete user's guide to PGP. It explains how to encrypt files and email, use digital signatures, create and certify keys, and customize PGP. Part IV, "Appendices", contains information on getting PGP, installing it on PCs, UNIX systems, and Macintoshes, and other background information. The book also contains a glossary, a bibliography, and a handy reference card which summarizes all of the PGP commands, environment variables, and configuration variables.

See other security books from O'Reilly on page 33 of this catalog and the article on page 62 of *ora.com*.

Order Number: 098-8, \$24.95 (est.)

Using UNIX AND X



X User Tools

By Linda Mui & Valerie Quercia
1st Edition October 1994 (est.)
854 pages (includes CD-ROM)
ISBN 1-56592-019-8

X User Tools provides for X users what *UNIX Power Tools* provides for UNIX users: hundreds of tips, tricks, scripts, techniques, and programs—plus a CD-ROM—to make the X Window System more enjoyable, more powerful, and easier to use.

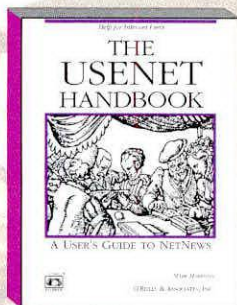
This browser's book emphasizes useful programs, culled from the network and contributed by X programmers worldwide. Programs range from fun (games, screensavers, and a variety of online clocks) to business tools (calendar, memo, and mailer programs) to graphics (programs for drawing, displaying, and converting images). You'll also find a number of tips and techniques for configuring both individual and systemwide environments, as well as a glossary of common X and UNIX terms.

The browser style of organization—pioneered by *UNIX Power Tools*—encourages readers to leaf through the book at will, focusing on what appeals at the time. Each article stands on its own, many containing cross-references to related articles. Before you know it, you'll have covered the entire book, simply by scanning what's of interest and following cross-references to more detailed information.

The enclosed CD-ROM contains source files for all of the programs and binary files for some of the programs—for a number of platforms, including Sun 4, Solaris, HP 700, Alpha/OSF, and RS6000/AIX. Note that the CD-ROM contains software for both emacs and tcl/tk, as well as more than 100 X-related programs described in the book.



Order Number: 019-8, \$49.95 (est.)



The USENET Handbook: A User's Guide to NetNews

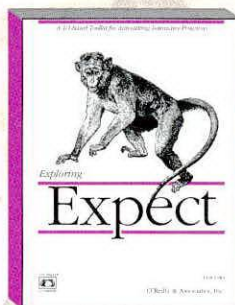
By Mark Harrison
1st Edition December 1994 (est.)
250 pages (est.), ISBN 1-56592-101-1

USENET, also called Netnews, is the world's largest discussion forum, encompassing the worldwide Internet and many other sites that aren't formally connected to any network. USENET provides a forum for asking and answering technical questions, arguing politics, religion, and society, or discussing most scientific, artistic, or humanistic disciplines. It's also a forum for distributing free software, as well as digitized pictures and sound.

This book unlocks USENET for you. It's not just a technical book, although it includes tutorials on the most popular newsreaders for UNIX and Windows (*tin*, *nn*, GNUS, and Trumpet). It also explains what goes on on the Net: where to look for information and what to do with it once you get it. And, it gives you an introduction into the culture: Net etiquette, the private language, and some of the history...including some of the more notable practical jokes.

► Check out Mike Loukides' article about unlocking the secrets of USENET on page 67 of *ora.com*.

Order Number: 101-1, \$24.95 (est.)



Exploring Expect: A Tcl- based Toolkit for Automating Interactive Programs

By Don Libes
1st Edition December 1994 (est.)
500 pages (est.), ISBN 1-56592-090-2

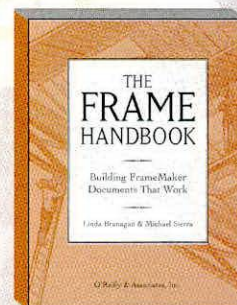
Written by the author of *Expect*, this is the first book to explain how this new part of the UNIX toolbox can be used to automate Telnet, Ftp, passwd, rlogin, and hundreds of other interactive applications. Based on Tcl (Tool Command Language), *Expect* lets you automate interactive applications that have previously been extremely difficult to handle with any scripting language.

This book describes Tcl and how *Expect* relates to it. It then describes the *Expect* language, using a combination of reference material and specific, useful examples of its features. It shows how to use *Expect* with Tcl, as well as with standard languages and tools like C, C++, and Tk, the X-based extension to Tcl. The strength in the book is in its scripts, conveniently listed in a separate index.

Whether your interest is in *Expect* or interaction automation, or you simply want to see how Tcl has been used in real software, you'll find this book a treasure-trove of valuable, easy-to-understand information.

► See excerpt on page 9 of *ora.com*.

Order Number: 090-2, \$29.95 (est.)



The Frame Handbook: Building FrameMaker Documents That Work

By Linda Branagan & Mike Sierra
1st Edition October 1994 (est.)
500 pages (est.), ISBN 1-56592-009-0

This guide to using the UNIX version of FrameMaker 4.0, a sophisticated document production system, takes you from a thorough overview of Frame to a good understanding of producing books or even book series. It is for everyone who creates technical manuals and reports, from technical writers and editors who will become power users, to administrative assistants and engineers. It begins by discussing the basic features of any text-formatting system: how it handles text and text-based tools (like spell-checking). It quickly gets into areas that benefit from a sophisticated tool like Frame: cross-references and footnotes; styles, master pages, and templates; tables and graphics; tables of contents and indexes; and, for those interested in online access, hypertext.

The book also contains three appendixes that make the use of Frame easier. They provide:

- A guide to the useful X resources that let you configure your Frame environment on a UNIX/X system
- Tables of keyboard and macro shortcuts
- A series of sophisticated tips and tricks about such topics as adding running tabs, creating master indexes, and mixing text and graphics

► See Mike Sierra's article about producing quality documents with FRAME in *ora.com*, page 65.

Order Number: 009-0, \$39.95 (est.)

"Expect was the first widely used Tcl application, and it is still one of the most popular. This is a must-know tool for system administrators and many others."

—John Ousterhout, John.Ousterhout@Eng.Sun.com

Fall Catalog

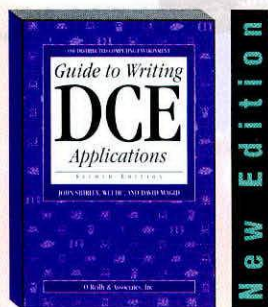
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NEW TITLES

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PROGRAMMING TOOLS & LIBRARIES



Guide to Writing DCE Applications

By John Shirley, Wei Hu & David Magid
2nd Edition May 1994
462 pages, ISBN 1-56592-045-7

A hands-on programming guide to OSF's Distributed Computing Environment (DCE) for first-time DCE application programmers. Designed to help new DCE users make the transition from conventional, nondistributed applications programming to distributed DCE programming. In addition to basic RPC (remote procedure calls), this edition covers object UUIDs and basic security (authentication and authorization).

Go online and read Tim O'Reilly's interview with Brian Moran of Microsoft on DCE/NT interoperability. You'll find the interview in the Global Network Navigator's "O'Reilly Resource Center" under "Features." Also posted on our online gopher catalog.

Order Number: 045-7, \$29.95



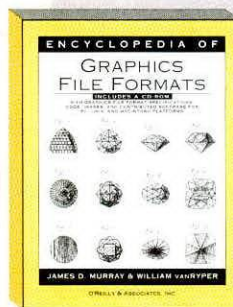
Multi-Platform Code Management

By Kevin Jameson
1st Edition August 1994
354 pages (includes two diskettes)
ISBN 1-56592-059-7

For any programming team that is struggling with build and maintenance problems, this book—and its accompanying software (available for fifteen platforms, including MS-DOS and various UNIX systems)—can save dozens of errors and hours of effort. A "one-stop-shopping" solution for code management problems, this book shows you how to structure a large project and keep your files and builds under control over many releases and platforms. Includes two diskettes that provide a complete system for managing source files and builds.

Check out the complete directory listings of these diskettes in the Global Network Navigator's "O'Reilly Resource Center" under "O'Reilly's Catalog and Ordering Information," "Book Descriptions," "Programming." Also posted in our online gopher catalog.

Order Number: 059-7, \$39.95



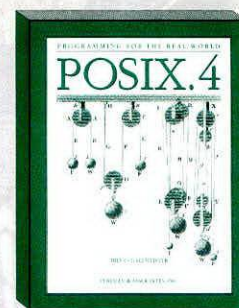
Encyclopedia of Graphics File Formats

By James D. Murray & William vanRyper
1st Edition July 1994
928 pages (includes CD-ROM)
ISBN 1-56592-058-9

This is the definitive work on file formats—the book is fast becoming a classic for graphics programmers and everyone who deals with the low-level technical details of graphics files. Includes technical information on nearly 100 file formats, as well as chapters on bitmap and vector files, metafiles, scene description, animation and multimedia formats, and file compression methods. Also included is a CD-ROM that collects the original vendor file format specification documents, graphics test images, coding examples, and graphics conversion and manipulation software. The most complete collection of information about these formats available anywhere.

Preview the complete directory listing of the CD-ROM in the Global Network Navigator's "O'Reilly Resource Center" under "O'Reilly's Catalog and Ordering Information," "Book Descriptions," "Books with CD-ROMs." Also posted in our online gopher catalog.

Order Number: 058-9, \$59.95



POSIX.4: Programming for the Real World

By Bill Gallmeister
1st Edition November 1994 (est.)
400 pages (est.), ISBN 1-56592-074-0

Real-world programming (typically called real-time programming) is programming that interacts in some way with the "real world" of daily life. Real-world programmers develop the unseen software that operates most of the world that surrounds you, software typically characterized by deadlines—and harsh penalties if the deadlines aren't met. When you've just rear-ended another car, it's no consolation that a sudden flurry of input slowed down your brake processor, so it couldn't react quickly enough when you hit the pedal.

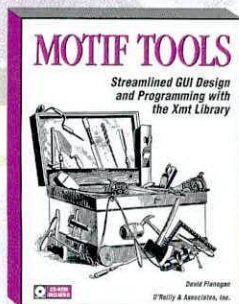
This book covers the POSIX.4 standard for portable real-time programming. The POSIX.4 standard itself is a massive document that defines system interfaces for asynchronous I/O, scheduling, communications, and other facilities. However, this book does more than explain the standard. It provides a general introduction to real-time programming and real-time issues: the problems software faces when it needs to interact with the real world and how to solve them. If you're at all interested in real-time applications—which include just about everything from telemetry to transaction processing—this book will be an essential reference.

Includes problem sets, answers, and reference manual pages for all functions and header files.

In this issue of *ora.com* editor Mike Loukides writes about POSIX.4 and our new book. You'll find his article on page 54.

Order Number: 074-0, \$29.95 (est.)

X PROGRAMMING



Motif Tools: Streamlined GUI Design and Programming with the Xmt Library

By David Flanagan
1st Edition August 1994
1024 pages (includes CD-ROM)
ISBN 1-56592-044-9

Motif Tools and the Xmt programming library that accompanies it on CD-ROM offer resources that will empower Motif programmers and dramatically speed up application development with the X Toolkit and Motif.

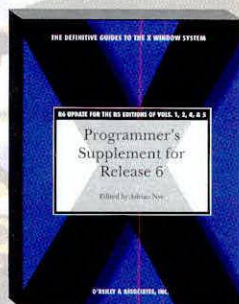
While the book is a complete programmer's guide and reference manual for the Xmt library, it is not just a dry volume about programming mechanics; it also describes a holistic philosophy of application design and development (from conception through design and implementation, and on to the finishing stylistic touches).

The author writes: "The need for a convenience toolkit is something that not enough programmers and managers realize; Motif is too often viewed as a complete GUI development package, when in fact it was designed only to provide a standard base level of functionality. My aim was to put programmer ease-of-use first and create a library that really simplifies GUI development."

The book comes with one software license. Call us for details about additional licenses.

- ▶ Read David Flanagan's article on the Xmt library in the Global Network Navigator's "O'Reilly Resource Center" under "Features," and the article in the X Department of *ora.com*. Also posted on our online gopher catalog.

Order Number: 044-9, \$54.95



Programmer's Supplement for Release 6

Edited by Adrian Nye
1st Edition January 1995 (est.)
300 pages (est.), ISBN 1-56592-089-9

This book is for programmers who are familiar with Release 5 of the X Window System and who want to know how to use the new features of Release 6. Intended as an update for owners of Volumes One, Two, Four, and Five of O'Reilly's *X Window System* series, it provides complete tutorial and reference information to all new Xlib and Xt toolkit functions.

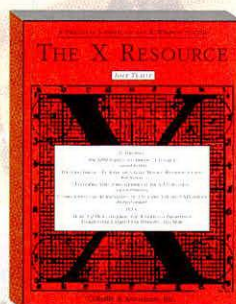
The book includes:

- An overview of the R6 changes as they affect application programming
- New Xt features, including session management, signal handling, and C++
- How to use transformed (rotated, scaled, or obliqued) fonts
- Internationalizing X applications
- An introduction to Release 6 extensions
- Reference pages for all new Xlib and Xt functions

Together with Volumes Two and Five, owners of the *Programmer's Supplement for Release 6* have a complete set of reference pages for the current X Consortium standards for Xlib and Xt.

- ▶ See page 24 for a description of O'Reilly's new *X Companion CD for R6*.

Order Number: 089-9, \$24.95 (est.)



The X Resource: Issue 12

Edited by Paula M. Ferguson
Fall 1994
222 pages, ISBN 1-56592-069-4

A quarterly working journal for X programmers that provides practical, timely information. *The X Resource* includes in-depth articles and documentation not available elsewhere. Articles for Issue 12 include: "The XPM Format and Library: A Tutorial and Reference", "The Xmsg Library: An Application-Level Message-Reporting Facility", and more.

- ▶ Read the article, excerpted from *The X Resource*, on X Consortium guidelines for writing portable X code. See the Global Network Navigator's "O'Reilly Resource Center" under "Features." Also posted on our online gopher catalog.
- ▶ See page 49 for a complete listing of *X Resource* issues.

Order Number: 069-4, \$14.95

- ▶ See the handy card "Make Tracks to O'Reilly" for instructions on how to access *The Global Network Navigator™* and O'Reilly's online gopher catalog.

Fall Catalog

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USING THE INTERNET

1994

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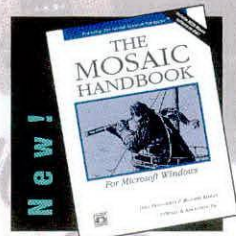
Over the last several years, I have been looking at ways to extend what we do into a new digital medium. I set up the Digital Media Group (DMG) at O'Reilly to develop online products. We saw the opportunity to begin serving Internet users with unique needs and interests. That led to the Global Network Navigator (GNN[®]), an Internet-based publications center. We were the first commercial publisher to use the World Wide Web as a publishing platform.

What does it mean to explore the Internet as a new digital publishing medium? There are more questions than answers. What does a news service look like? How does a magazine work online? How will advertising be most effective in this medium? What new kinds of products or services could we develop? These are some of the challenges we face.

In 1995, some of DMG's products may also come in print or on CD-ROM, as we take materials that we develop for an online audience and adapt them for a larger audience who is not yet connected. We also want to share our experiences with others who would like to publish on the Internet. After all, to be on the Internet is more than being a user, a consumer of services; it means contributing something yourself to its richness.

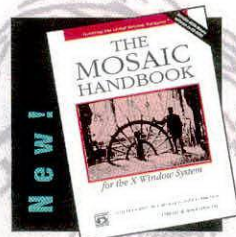
—Dale Dougherty

Dale Dougherty is the publisher of The Global Network Navigator and an editor and author at O'Reilly.



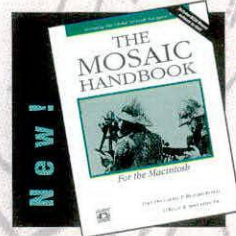
The Mosaic Handbook for Microsoft Windows

Order Number: 094-5
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The Mosaic Handbook for the X Window System

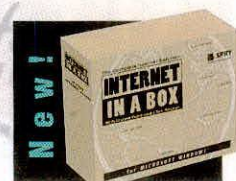
Order Number: 095-3
\$29.95



The Mosaic Handbook for the Macintosh

Order Number: 096-1
\$29.95

► Mosaic is a popular graphical interface that makes it easy to explore the Internet. Although it's widely used, a comprehensive guide to Mosaic hasn't been available—until now. See page 22 for details.

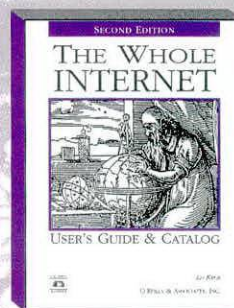


Internet In A Box

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► The all-in-one package for PC users who want to get on the Internet. Read more about Internet In A Box on page 23.

More Than 400,000 Copies Sold!



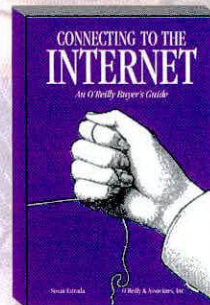
The Whole Internet User's Guide & Catalog

By Ed Krol
2nd Edition April 1994
574 pages, ISBN 1-56592-063-5

The best book about the Internet just got better! This is the second edition of our comprehensive—

and bestselling—introduction to the Internet, the international network that includes virtually every major computer site in the world. In addition to email, file transfer, remote login, and network news, this book pays special attention to some new tools for helping you find information. Useful to beginners and veterans alike, this book will help you explore what's possible on the Net. Also includes a pull-out quick-reference card.

Order Number: 063-5, \$24.95



Connecting to the Internet

By Susan Estrada
1st Edition August 1993
188 pages, ISBN 1-56592-061-9

This book provides practical advice on how to get an Internet connection. It describes how to assess your needs to determine the kind of Internet service that is best

for you and how to find a local access provider and evaluate the services they offer.

Knowing how to purchase the right kind of Internet access can help you save money and avoid a lot of frustration. This book is the fastest way for you to learn how to get on the Internet. Then you can begin exploring one of the world's most valuable resources.

Order Number: 061-9, \$15.95

"Where the first edition guide was strong, the second is stronger still. It's one of the best-written computer books on any topic—clear, concise, and fun to read—and this new edition has added huge sections that cover what to do on the Internet organized according to topic, content, and PDIAL lists."

—PC Magazine, October 11, 1994

About The Whole Internet Users Guide & Catalog

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Or if you are using the Global Network Navigator (GNN®), click on the underlined O'Reilly name in the trademark statement at the bottom of the GNN home page to access O'Reilly's Resource Center.

If you do not have a Web browser, telnet to:

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telnet login: **gnnguest**

For the plain-text version, telnet or gopher to:

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telnet login: **gopher**

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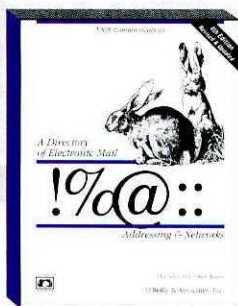
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New Edition

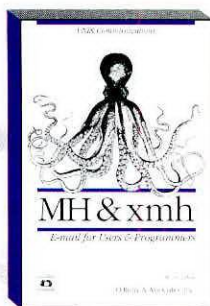
!%&@:: A Directory of Electronic Mail Addressing & Networks

By Donnalyn Frey & Rick Adams
4th Edition June 1994
662 pages, ISBN 1-56592-046-5

This is the only up-to-date directory that charts the networks that make up the Internet, provides contact names and addresses, and describes the services each network provides. It includes all of the major Internet-based networks, as well as various commercial networks such as CompuServe, Delphi, and America Online that are "gatewayed" to the Internet for transfer of electronic mail and other services. If you are someone who wants to connect to the Internet, or someone who already is connected but wants concise, up-to-date information on many of the world's networks, check out this book.

This is the fourth edition of this directory. A must-have for frequent users of email.

New Low Price (Was \$24.95)
Order Number: 046-5, \$9.95



MH & xmh: E-mail for Users & Programmers

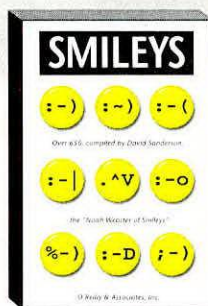
By Jerry Peek
2nd Edition September 1992
728 pages, ISBN 1-56592-027-9

Customizing your email environment can save you time and make communicating more enjoyable. *MH & xmh: E-mail for Users & Programmers* explains how to use, customize, and program with the MH electronic mail commands available on virtually any UNIX system. The handbook also covers *xmh*, an X Window System client that runs MH programs.

Don't be intimidated by the size of this book: MH and *xmh* are easy to learn and use. You can learn to use MH by reading only the 14 pages in Chapter 4. Chapter 14 covers *xmh* in 19 pages (about 7 of those are Figures). All the rest of the book is there to help you do things that you never thought you could do with an email system. This handbook is packed with explanations and useful examples of MH and *xmh* features, some of which are only hinted at in standard documentation.

The second edition is updated for X Release 5 and MH 6.7.2. We added a chapter on *mbook*, sections explaining under-appreciated small commands and features, and more examples showing how to use MH to handle common situations.

Order Number: 027-9, \$29.95

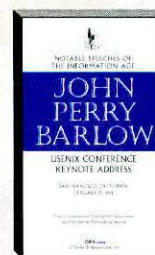


Smileys

By David W. Sanderson
1st Edition March 1993
93 pages, ISBN 1-56592-041-4

From the people who put an armadillo on the cover of a system administrator book comes this collection of the computer underground hieroglyphs called "smileys." Originally inserted into email messages to denote "said with a cynical smile" :-), smileys now run rampant throughout the electronic mail culture. They include references to politics 7:^] (Ronald Reagan), entertainment C]::= (Charlie Chaplin), history 4:-) (George Washington), and mythology @-) (cyclops). They can laugh out loud %-(! wink :-) yell :-(!) frown :-(and even drool :-)~.

Order Number: 041-4, \$5.95



Audio Tape

Notable Speeches of the Information Age, John Perry Barlow

January 17, 1994; San Francisco, CA
Duration: 90 minutes, ISBN 1-56592-992-6

John Perry Barlow—retired Wyoming cattle rancher, lyricist for the Grateful Dead since 1971—holds a degree in comparative religion from Wesleyan University. He also happens to be a recognized authority on computer security, virtual reality, digitized intellectual property, and the social and legal conditions arising in the global network of computers. In 1990 Barlow co-founded the Electronic Frontier Foundation with Mitch Kapor and currently serves as chair of its executive committee.

In his keynote address to the Winter 1994 USENIX Conference, Barlow talks of recent developments in the national information infrastructure, telecommunications regulation, cryptography, globalization of the Internet, intellectual property, and the settlement of Cyberspace.

Side A contains the keynote; Side B contains a question and answer session.

► Read an excerpt of this tape on page 68 of *ora.com*.

Order Number: 992-6, \$9.95

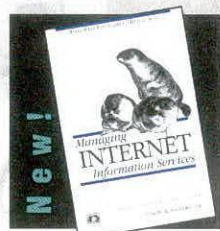
Books should help the reader to "become creative": to understand enough about the problem they're facing to come up with their own solution. Such a book has to link theory and practice. You can't anticipate every problem a reader might face; you also can't write a book that explains the background, but never gets down into the mud. Readers need to understand both the practicalities and the theory.

I want to work on books that I will find interesting and enjoyable. Technically, I'm interested in system administration and networking—both end-user tools and network management. I'm particularly looking for books on various aspects of building networks and using new communications technologies.

I also want books to be enjoyable. One doesn't usually think of "pleasure" and technical books in the same breath—but why not? Authors are asking readers to make a big commitment to their thoughts—the reader should get more for his/her effort than a headache. As an editor, my role is to help technical authors write books people will want to read.

—Mike Loukides

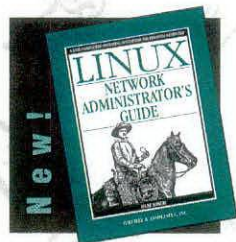
Mike Loukides was midwife to the first and second edition of The Whole Internet User's Guide & Catalog, and has edited a number of O'Reilly's system administration books.



Managing Internet Information Services

▶ A "must-have" if you are responsible for setting up Internet services in your company or organization. For more information about this book, see page 24.

Order Number: 062-7, \$29.95 (est.)

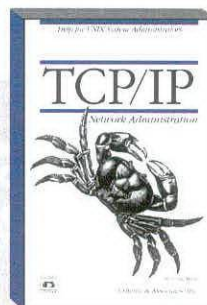


Linux Network Administrator's Guide

▶ Covers all the essential networking software included with Linux. See page 24 for an in-depth description of this book.

Order Number: 087-2, \$24.95 (est.)

INTERNET



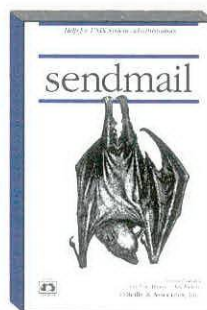
TCP/IP Network Administration

By Craig Hunt
1st Edition August 1992
502 pages, ISBN 0-937175-82-X

TCP/IP Network Administration is a complete guide to setting up and running a TCP/IP network for administrators of networks of systems or lone home systems that access the Internet. It starts with the fundamentals: what the protocols do and how they work, how to request a network address and a name (the forms needed are included in an appendix), and how to set up your network.

Beyond basic setup, the book discusses how to configure important network applications, including sendmail, the *r** commands, and some simple setups for NIS and NFS. There are also chapters on troubleshooting and security. In addition, this book covers several important packages that are available from the Net (such as *gated*). Covers BSD and System V TCP/IP implementations.

Order Number: 82-X, \$29.95



sendmail

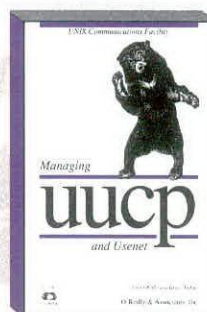
By Bryan Costales,
with Eric Allman & Neil Rickert
1st Edition November 1993
830 pages, ISBN 1-56592-056-2

This is far and away the most comprehensive book ever written on sendmail, the program that acts like a traffic cop in routing and delivering mail on UNIX-based networks. Although sendmail is used on almost every UNIX system, it's one of the last great

uncharted territories—and most difficult utilities to learn—in UNIX system administration.

This book provides a complete sendmail tutorial, plus extensive reference materials on every aspect of the program. It covers IDA, sendmail, the latest version (V8) from Berkeley, and the standard versions available on most systems. Part One of the book is a tutorial on understanding sendmail; Part Two covers practical issues in sendmail administration; Part Three is a comprehensive reference section; and Part Four consists of appendices and a bibliography.

Order Number: 056-2, \$32.95



Managing UUCP and Usenet

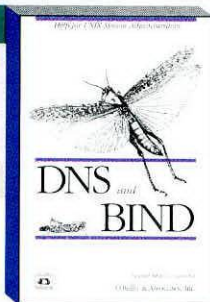
By Grace Todino & Tim O'Reilly
10th Edition January 1992
368 pages, ISBN 0-937175-93-5

This handbook is meant for system administrators who want to install and manage the UUCP and Usenet software. It covers HoneyDanBer UUCP, as well as standard Version 2 UUCP, with special notes on Xenix. As one reader noted over the Net, "Don't even TRY to install UUCP without it!"

The tenth edition of this classic work has been revised and expanded to include descriptions of:

- How to use NNTP (Network News Transfer Protocol) to transfer Usenet news over TCP/IP and other high-speed networks
- How to get DOS versions of UUCP
- How to set up DOS-based laptop computers as traveling UUCP nodes
- How the UUCP 'g' protocol works

Order Number: 93-5, \$27.95



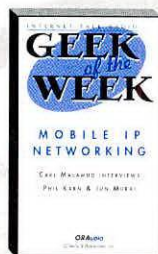
DNS and BIND

By Paul Albitz & Cricket Liu
1st Edition October 1992
418 pages, ISBN 1-56592-010-4

This book is a complete guide to the Internet's Domain Name System (DNS) and the Berkeley Internet Name Domain (BIND) software, the UNIX implementation of DNS. DNS is the system that translates hostnames (like "rock.ora.com") into Internet addresses (like 192.54.67.23). Until BIND was developed, name translation was based on a "host table"; if you were on the Internet, you got a table that listed all the systems connected to the Net and their addresses. As the Internet grew from hundreds to hundreds of thousands of systems, host tables became unworkable. DNS is a distributed database that solves the same problem effectively, allowing the Net to grow without constraints. Rather than having a central table that gets distributed to every system on the Net, it allows local administrators to assign their own hostnames and addresses and install these names in a local database. This database is automatically distributed to other systems as names are needed.

In addition to covering the basics, this book covers many more advanced topics: how to become a "parent" (i.e., "delegate" the ability to assign names to someone else); how to use DNS to set up mail forwarding correctly; debugging and troubleshooting; and programming. Assumes a basic knowledge of system administration and network management.

Order Number: 010-4, \$29.95



Mobile IP Networking

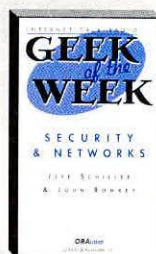
Carl Malamud interviews
Phil Karn & Jun Murai
Released Spring 1994
Duration: 1 hour, ISBN 1-56592-994-2

As portable computers become more common, the Internet Protocol will need to change to support mobile computing. On this tape, Carl Malamud interviews two of the pioneers in this field.

Phil Karn is the father of the KA9Q publicly available implementation of TCP/IP for DOS. Phil's current research focus is on commercial applications of wireless data communications.

Jun Murai is a professor at Keio University and the founder of the Japanese WIDE Internet. Murai talks about his research projects, which range from satellite-based IP multicasting to a massive testbed for mobile computing at the Keio University.

Order Number: 994-2, \$9.95



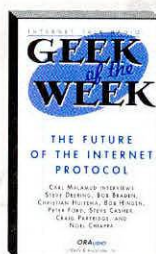
Security and Networks

Carl Malamud interviews
Jeff Schiller & John Romkey
Released September 1993
Duration: 1 hour, ISBN 1-56592-997-7

Jeff Schiller is the manager of MIT's campus network and one of the Internet's leading security experts. Here, he talks about Privacy Enhanced Mail (PEM), the difficulty of policing the Internet, and whether horses or computers are more useful to criminals.

John Romkey has been a long-time TCP/IP developer and was recently named to the Internet Architecture Board. John talks about the famous "ToasterNet" demo at InterOp, what kind of Internet security he'd like to see put in place, and what Internet applications of the future might look like.

Order Number: 997-7, \$9.95

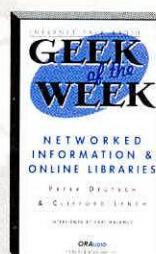


The Future of the Internet Protocol

Carl Malamud interviews Steve Deering, Bob Braden, Christian Huitema, Bob Hinden, Peter Ford, Steve Casner, Bernhard Stockman & Noel Chiappa
Released Spring 1994
Duration: 4 hours, ISBN 1-56592-996-9

The explosion of interest in the Internet puts stress on what was originally designed as a research and education network. The sheer number of users is requiring new strategies for Internet address allocation; multimedia applications are requiring greater bandwidth and strategies such as "resource reservation" to provide synchronous end-to-end service. In this series of eight interviews, Carl Malamud talks to some of the researchers who are working to define how the underlying technology of the Internet will need to evolve in order to meet the demands of the next five to ten years.

Order Number: 996-9, \$24.95



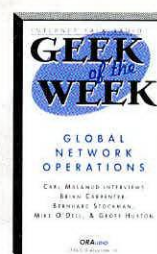
Networked Information and Online Libraries

Carl Malamud interviews
Peter Deutsch & Cliff Lynch
Released September 1993
Duration: 1 hour, ISBN 1-56592-998-5

Peter Deutsch, president of Bunyip Information Services, was one of the co-developers of Archie. In this interview Peter talks about his philosophy for services and compares Archie to X.500. He also talks about what kind of standards we need for networked information retrieval.

Cliff Lynch is currently the director of library automation for the University of California. He discusses issues behind online publishing, such as SGML and the democratization of publishing on the Internet.

Order Number: 998-5, \$9.95



Global Network Operations

Carl Malamud interviews Brian Carpenter, Bernhard Stockman, Mike O'Dell & Geoff Huston
Released Spring 1994
Duration: 2 hours, ISBN 1-56592-993-4

What does it take to actually run a network? Carl Malamud explores some of the technical and operational issues faced by Internet service providers around the world.

Brian Carpenter, director for networking at CERN, discusses the OSI and DECnet Phase V protocols.

Bernhard Stockman, one of the founders and the technical manager of the European Backbone (EBONE), has been a leader in the deployment of CIDR and BGP-4.

Mike O'Dell, vice president for research at UUNET Technologies, is helping define new services for one of the largest commercial IP service providers.

Geoff Huston, director of the Australian Academic Research Network (AARNET), talks about how networking in Australia has flourished despite astronomically high rates for long-distance lines.

Order Number: 993-4, \$9.95



European Networking

Carl Malamud interviews
Glenn Kowack & Rob Blokzijl
Released September 1993
Duration: 1 hour, ISBN 1-56592-999-3

Glenn Kowack is chief executive of EUnet, the network that's bringing the Internet to the people of Europe. Glenn talks about EUnet's populist business model and the politics of European networking.

Rob Blokzijl is the network manager for NIKHEF, the Dutch Institute of High Energy Physics. Rob talks about RIPE, the IP user's group for Europe, and the nuts and bolts of European network coordination.

Order Number: 999-3, \$9.95

Fall Catalog

D.R.A.

SYS/ADMIN

1994

O'Reilly & Associates

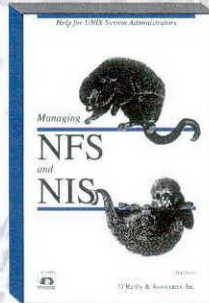
When I was a kid, I loved my Captain Midnight decoder ring, Edgar Allen Poe's "The Gold Bug," and all types of secret codes. Working as a consultant before joining O'Reilly, I found myself gravitating to computer security, the next best thing to being a secret agent. I felt kind of like a misfit in the computer world, though. Security was not a popular area, and only the government, big banks, and other paranoid organizations seemed to worry about it. For many people, the first awakening came when Robert Morris Jr.'s worm wriggled its way through the Internet about five years ago. Suddenly, it became apparent that security—and the lack of it—affects us all.

The boom in Internet usage has upped the ante. More than a hundred million electronic mail messages are sent and received every day. Businesses using the Internet for commercial purposes need ways to encrypt credit card numbers, put digital signatures on documents, and keep unauthorized users out of their systems and databases. And they need information—the kind of information I hope our computer security books provide. I see our security books as a complement to our Internet books—ways of helping our customers navigate the new world without risking losing their luggage—or more.

—Deborah Russell

Deborah Russell is an acquisitions editor for O'Reilly, co-author of *Computer Security Basics*, and editor of the computer security series, as well as a variety of other books.

UNIX

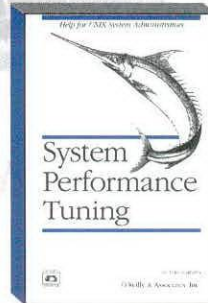


Managing NFS and NIS

By Hal Stern
1st Edition June 1991
436 pages, ISBN 0-937175-75-7

As popular as NFS is, it is a "black box" for most users and administrators. This book provides a comprehensive discussion of how to plan, set up, and debug an NFS network. It is the only book we're aware of that discusses NFS and network performance tuning. This book also covers the NFS automounter, network security issues, diskless workstations, and PC/NFS. It also tells you how to use NIS to manage your own database applications, ranging from a simple telephone list to controlling access to network services. If you are managing a network of UNIX systems, or are thinking of setting up a UNIX network, you can't afford to overlook this book.

Order Number: 75-7, \$27.95



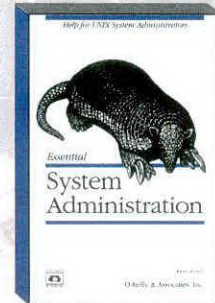
System Performance Tuning

By Mike Loukides
1st Edition November 1990
336 pages, ISBN 0-937175-60-9

System Performance Tuning answers one of the most fundamental questions you can ask about your computer: How can I get it to do more work without buying more hardware?

If your system gets sluggish when you start a big job, if it feels as if you spend hours waiting for remote file access to complete, if your system stops dead when several users are active at the same time, you need to read this book. Some performance problems do require you to buy a bigger or faster computer, but many can be solved simply by making better use of the resources you already have.

Order Number: 60-9, \$24.95



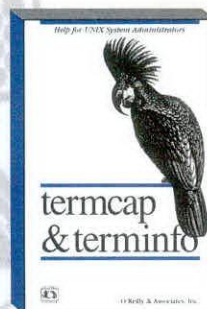
Essential System Administration

By Aileen Frisch
1st Edition October 1991
466 pages, ISBN 0-937175-80-3

Like any other multi-user system, UNIX requires some care and feeding. *Essential System Administration* tells you how. This book strips away the myth and confusion surrounding this important topic and provides a compact, manageable introduction to the tasks faced by anyone responsible for a UNIX system.

If you use a stand-alone UNIX system, whether it's a PC or a workstation, you know how much you need this book: on these systems the fine line between a user and an administrator has vanished. Either you're both or you're in trouble. If you routinely provide administrative support for a larger shared system or a network of workstations, you will find this book indispensable.

Order Number: 80-3, \$29.95

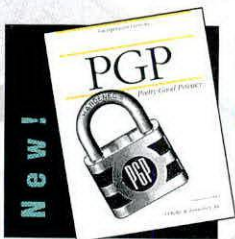


termcap & terminfo

By John Strang, Linda Mui & Tim O'Reilly
3rd Edition April 1988
270 pages, ISBN 0-937175-22-6

The termcap and terminfo databases are UNIX's solution to the difficulty of supporting many terminals without writing special drivers for each terminal. Termcap (BSD) and terminfo (System V) describe the features of hundreds of terminals, together with a library of routines that allow programs to use those capabilities. This book documents hundreds of capabilities and syntax for termcap and terminfo, writing and debugging terminal descriptions, and terminal initialization.

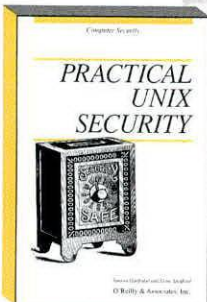
Order Number: 22-6, \$21.95

**PGP: Pretty Good Privacy**

Tells you how to send secure, private email.

► Read more about it on pages 24 and 64.

Order Number: 098-8, \$24.95 (est.)

**Practical UNIX Security**

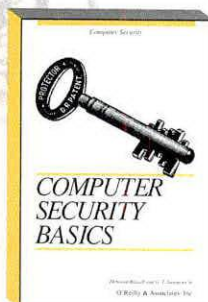
By Simon Garfinkel & Gene Spafford

1st Edition June 1991

512 pages, ISBN 0-937175-72-2

Practical UNIX Security tells system administrators how to make their UNIX system—either System V or BSD—as secure as it possibly can be without going to trusted system technology. The book describes UNIX concepts and how they enforce security, tells how to defend against and handle security breaches, and explains network security (including UUCP, NFS, Kerberos, and firewall machines) in detail. If you are a UNIX system administrator or user who deals with security, you need this book.

Order Number: 72-2, \$29.95

**Computer Security Basics**

By Deborah Russell & G.T. Gangemi Sr.

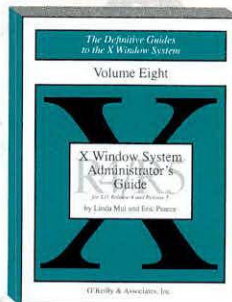
1st Edition July 1991

464 pages, ISBN 0-937175-71-4

There's a lot more consciousness of security today, but not a lot of understanding of what it means and how far it should go. This handbook describes complicated concepts, such as trusted systems, encryption, and mandatory access control, in simple terms.

For example, most U.S. government equipment acquisitions now require "Orange Book" (Trusted Computer System Evaluation Criteria) certification. A lot of people have a vague feeling that they ought to know about the Orange Book, but few make the effort to track it down and read it. *Computer Security Basics* contains a more readable introduction to the Orange Book—why it exists, what it contains, and what the different security levels are all about—than any other book or government publication.

Order Number: 71-4, \$29.95

**Volume 8:
X Window System
Administrator's Guide**

By Linda Mui & Eric Pearce

1st Edition October 1992

372 pages, ISBN 0-937175-83-8

As X moves out of the hacker's domain and into the "real world," users can't be expected to master all the ins and outs of setting up and administering their own X software. That will increasingly become the domain of system administrators. Even for experienced system administrators, X raises many issues, both because of subtle changes in the standard UNIX way of doing things and because X blurs the boundaries between different platforms. Under X, users can run applications across the network on systems with different resources (including fonts, colors, and screen size). Many of these issues are poorly understood, and the technology for dealing with them is in rapid flux.

This book is the first and only book devoted to the issues of system administration for X and X-based networks, written not just for UNIX system administrators, but for anyone faced with the job of administering X (including those running X on stand-alone workstations).

Order Numbers: 83-8, \$29.95

New CD-ROM**The X Companion CD for R6**

1st Edition November 1994 (est.)

CD-ROM plus 80-page guide,
ISBN 1-56592-084-8

► No need to compile!
Just load and run. See
page 24 for details.



Order Numbers: 084-8, \$29.95

Fall Catalog

O.R.A.

USING UNIX & X

1994

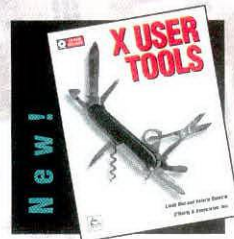
O'Reilly & Associates

I like to tell people we're not in publishing at all, but in the information business. We look for areas where people are suffering "information pain"—either from too much information or from too little—and try to figure out how to help.

Our traditional UNIX and X book lines were created to address a vacuum. Because much of what we wrote about was originally developed as free software, documentation was a poor stepchild. General books that skimmed the surface while trying to reach the broadest possible audience just weren't enough. We knew that the real problems went deep, so we wrote detailed books on individual UNIX utilities, on X programming, on system administration, and on using the Internet.

Ultimately, what ties all our projects together is the desire to make ourselves useful. We provide information that we think people need. We're not terribly attached to a particular market or topic; we just put our ears to the ground and follow the sounds of people in distress.

—Tim O'Reilly, President and Publisher.
O'Reilly & Associates, Inc.

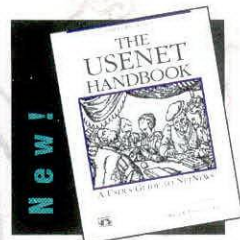


X User Tools

Includes everything from screensavers to business tools to graphics.

▶ Page 25 covers this book in-depth.

Order Number: 019-8
\$49.95 (est.)

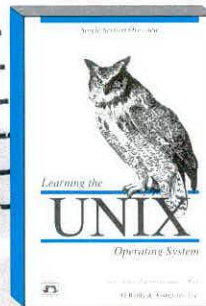


The USENET Handbook: A Users Guide to NetNews

How to get the most out of network news!

▶ See page 25.

Order Number: 101-1
\$24.95 (est.)



Learning the UNIX Operating System

By Grace Todino,
John Strang
& Jerry Peek
3rd Edition Aug 1993
108 pages,
ISBN 1-56592-060-0

If you are new to UNIX, this concise

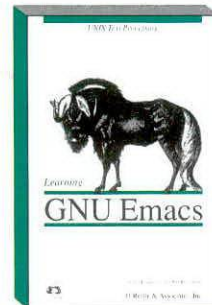
introduction will tell you just what you need to get started and no more. Why wade through a 600-page book when you can begin working productively in a matter of minutes? It's an ideal primer for Mac and PC users of the Internet who need to know a little bit about UNIX on the systems they visit.

This book is the most effective introduction to UNIX in print. The third edition has been updated and expanded to provide increased coverage of window systems and networking. It's a handy book for someone just starting with UNIX, as well as someone who encounters a UNIX system as a "visitor" via remote login over the Internet.

Order Number: 060-0, \$9.95

Learning GNU Emacs

By Debra Cameron & Bill Rosenblatt
1st Edition October 1991
442 pages, ISBN 0-937175-84-6

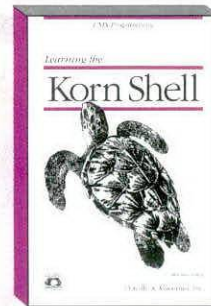


GNU Emacs is the most popular and wide spread of the Emacs family of editors. It is also the most powerful and flexible. (Unlike all other text editors, GNU Emacs is a

complete working environment—you can stay within Emacs all day without leaving.) This book tells you how to get started with the GNU Emacs editor. It will also "grow" with you: as you become more proficient, this book will help you learn how to use Emacs more effectively. It will take you from basic Emacs usage (simple text editing) to moderately complicated customization and programming.

The book is aimed at new Emacs users, whether or not they are programmers. Also useful for readers switching from other Emacs implementations to GNU Emacs.

Order Number: 84-6, \$27.95



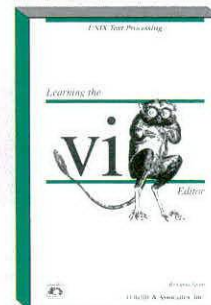
Learning the Korn Shell

By Bill Rosenblatt
1st Edition June 1993
363 pages, ISBN 1-56592-054-6

This Nutshell Handbook® is a thorough introduction to the Korn shell, both as a user interface and as a programming language.

The Korn shell is a program that interprets UNIX commands. It has many features that aren't found in other shells, including command history. This book provides a clear and concise explanation of the Korn shell's features. It explains *ksb* string operations, co-processes, signals and signal handling, and command-line interpretation. Also includes real-life programming examples and a Korn shell debugger called *ksbdb*, the only known implementation of a shell debugger anywhere.

Order Number: 054-6, \$27.95

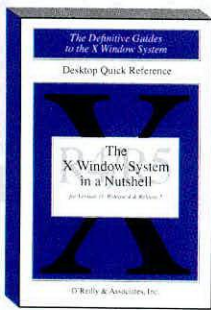


Learning the vi Editor

By Linda Lamb
5th Edition October 1990
192 pages, ISBN 0-937175-67-6

For many users, working in the UNIX environment means using *vi*, a full-screen text editor available on most UNIX systems. Even those who know *vi* often make use of only a small number of its features. This is the complete guide to text editing with *vi*. Early chapters cover the basics; later chapters explain more advanced editing tools, such as *ex* commands and global search and replacement. Also includes a pull-out quick-reference card.

Order Number: 67-6, \$21.95

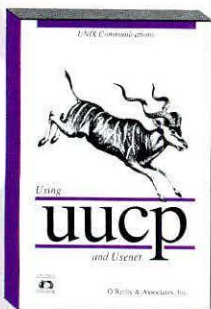


The X Window System in a Nutshell

Edited by Ellie Cutler, Daniel Gilly & Tim O'Reilly
2nd Edition April 1992
424 pages, ISBN 1-56592-017-1

An indispensable companion to the *X Window System* series. Once programmers have mastered the concepts behind X and learned how to program in Xlib and Xt, there is still a mass of details to remember. *The X Window System in a Nutshell* fills this gap. Experienced X programmers can use this single-volume desktop companion for most common questions, keeping the full *X Window System* series of manuals for detailed reference. *X in a Nutshell* contains essential information in a quick-reference format. This book has been updated to cover R5, but is still useful for R4. The descriptions of the functions have been expanded and clarified, with improved cross-referencing to important related functions. Includes material on Xcms and the internationalization features of R5.

Order Number: 017-1, \$9.95

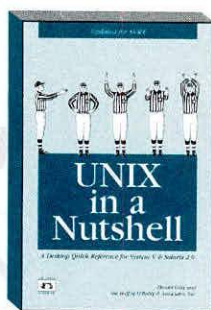


Using UUCP and Usenet

By Grace Todino & Dale Dougherty
1st Edition February 1986
(latest update October 1991)
210 pages, ISBN 0-937175-10-2

Shows users how to communicate with both UNIX and non-UNIX systems using UUCP and *cu* or *tip* and how to read news and post articles. This handbook assumes that UUCP is already running at your site.

Order Number: 10-2, \$21.95



Best seller

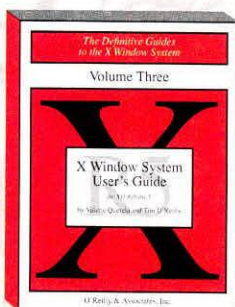
Our UNIX in a Nutshell guides are the most comprehensive quick references on the market—a must for every UNIX user. A huge amount of information at an unbelievably low price.

UNIX in a Nutshell: System V Edition

By Daniel Gilly & the staff of O'Reilly & Associates
2nd Edition June 1992
444 pages, ISBN 1-56592-001-5

You may have seen UNIX quick-reference guides, but you've never seen anything like *UNIX in a Nutshell*. This book is a complete reference containing all commands and options, along with generous descriptions and examples that put the commands in context. Covers System V, Releases 3 and 4, and Solaris 2.0.

Order Number: 001-5, \$9.95

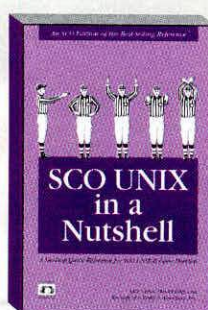


Volume 3M: X Window System User's Guide

Motif Edition
By Valerie Quercia & Tim O'Reilly
2nd Edition January 1993
956 pages, ISBN 1-56592-015-5

Orients the new user to window system concepts and provides detailed tutorials for many client programs, including the *xterm* terminal emulator and the *twm*, *uwm*, and *mwm* window managers. Later chapters explain how to customize the X environment. Revised for Motif 1.2 and X11 Release 5.

Order Number: 015-5, \$34.95

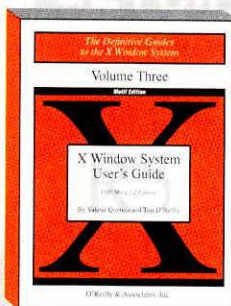


SCO UNIX in a Nutshell

By Ellie Cutler & the staff of O'Reilly & Associates
1st Edition February 1994
590 pages, ISBN 1-56592-037-6

The desktop reference to SCO UNIX and Open Desktop, this version of *UNIX in a Nutshell* shows you what's under the hood of your SCO system. It isn't a scaled-down quick reference of common commands, but a complete reference containing all user, programming, administration, and networking commands.

Order Number: 037-6, \$9.95

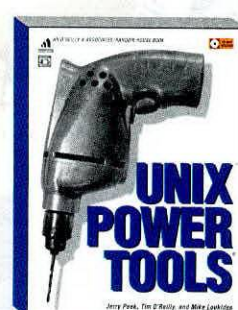


Volume 3: X Window System User's Guide

Standard Edition
By Valerie Quercia & Tim O'Reilly
4th Edition May 1993
836 pages, ISBN 1-56592-014-7

Orients the new user to window system concepts and provides detailed tutorials for many client programs, including the *xterm* terminal emulator and window managers. Later chapters explain how to customize the X environment. This popular manual is available in two editions, one for users of the MIT software, one for users of Motif. Revised for X11 Release 5.

Order Number: 014-7, \$34.95



Best seller

UNIX Power Tools

By Jerry Peek, Mike Loukides, Tim O'Reilly, et al.
1st Edition March 1993
1162 pages (includes CD-ROM)
Random House ISBN 0-679-79073-X

Ideal for UNIX users who hunger for technical—yet accessible—information. Consists of tips, tricks, concepts, and freeware. Covers add-on utilities and how to take advantage of clever features in the most popular UNIX utilities. (CD-ROM included.)

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sed & awk

By Dale Dougherty
1st Edition November 1990
414 pages, ISBN 0-937175-59-5

For people who create and modify text files, *sed* and *awk* are power tools for editing. This book contains a comprehensive treatment of *sed* and *awk* syntax. It emphasizes the kinds of practical problems that *sed* and *awk* can help users to solve, with many useful example scripts and programs.

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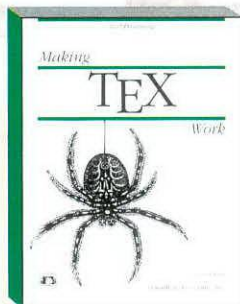
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Making TeX Work

By Norman Walsb
1st Edition April 1994
522 pages, ISBN 1-56592-051-1

TeX is a powerful tool for creating professional-quality typeset text and is unsurpassed at typesetting mathematical equations, scientific text, and multiple languages. Many books describe how you use TeX to construct sentences, paragraphs, and chapters. Until now, no book has described all the software that actually lets you build, run, and use TeX to best advantage on your platform. Because creating a TeX document requires the use of many tools, this lack of information is a serious problem for TeX users.

TeX is increasing in popularity, and the need for information is becoming more critical. Many technical journals now request that articles be submitted in TeX. TeX is also playing an increasing role in the Standard Generalized Markup Language (SGML) environment. TeX's portability and flexibility—not to mention the fact that it is free—are also making it the typesetting tool of choice for interchange between hardware and software platforms and for international exchange.

Making TeX Work guides you through the maze of tools available in the TeX system. Beyond the core TeX program there are myriad drivers, macro packages, previewers, printing programs, online documentation facilities, graphics programs, and more. This book describes them all.

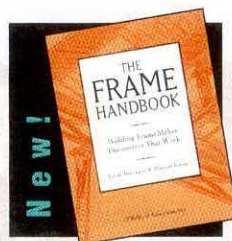
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The Frame Handbook

A thorough guide to Frame, a sophisticated document production system.

See page 25.

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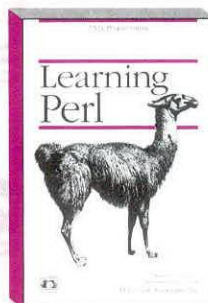
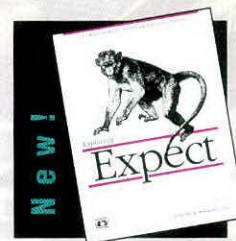


Exploring Expect

Written by the author of Expect.

Read more about this book on page 25.

Order Number: 090-2, \$29.95 (est.)



Learning Perl

By Randal L. Schwartz,
Foreword by Larry Wall
1st Edition November 1993
274 pages, ISBN 1-56592-042-2

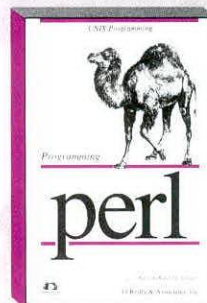
Learning Perl is ideal for system administrators, programmers, and anyone else wanting a down-to-earth introduction to this useful language. Written by a Perl trainer, its aim is to

make a competent, hands-on Perl programmer out of the reader as quickly as possible. The book takes a tutorial approach and includes hundreds of short code examples, along with some lengthy ones. The relatively inexperienced programmer will find *Learning Perl* easily accessible.

Each chapter of the book includes practical programming exercises. Solutions are presented for all exercises.

For a comprehensive and detailed guide to advanced programming with Perl, read O'Reilly's companion book, *Programming perl*.

Order Number: 042-2, \$24.95



Programming perl

By Larry Wall
& Randal L. Schwartz
1st Edition January 1991
482 pages, ISBN 0-937175-64-1

This is the authoritative guide to the hottest new UNIX utility in years, co-authored by its creator, Larry Wall. Perl is a language for easily manipulating text, files, and

processes. Perl provides a more concise and readable way to do many jobs that were formerly accomplished (with difficulty) by programming in the C language or one of the shells.

Programming perl covers Perl syntax, functions, debugging, efficiency, the Perl library, and more, including real-world Perl programs dealing with such issues as system administration and text manipulation.

Also includes a pull-out quick-reference card (designed and created by Johan Vromans).

Order Number: 64-1, \$29.95

"Learning Perl is a fine introductory text that can dramatically ease moving into the world of perl."

—Rob Kolstad, ;login:, January/February 1994

"The definitive reference for this language is Programming perl."

—UnixWorld, October 1993

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Learning Perl and Programming perl

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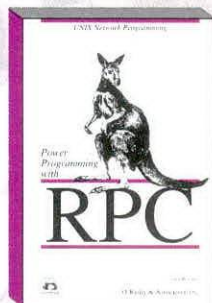
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—Andy Oram

Andy Oram is a writer and editor at O'Reilly, specializing in programmer's books, software engineering, and DCE.



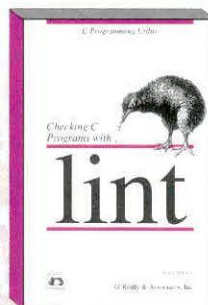
Power Programming with RPC

By John Bloomer
1st Edition February 1992
522 pages, ISBN 0-937175-77-3

RPC, or remote procedure calling, is the ability to distribute the execution of functions on remote computers outside of the application's current address space. This allows you to break large or complex programming problems into routines that can be executed independently of one another to take advantage of multiple computers. Thus, RPC makes it possible to attack a problem using a form of parallel or multiprocessing.

Written from a programmer's perspective, this book shows what you can do with Sun RPC, the de facto standard on UNIX systems. It covers related programming topics for Sun and other UNIX systems and teaches through examples.

Order Number: 77-3, \$29.95

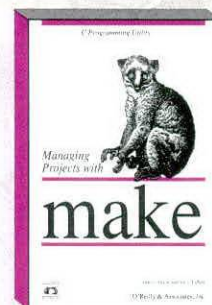


Checking C Programs with lint

By Ian F. Darwin
1st Edition October 1988
84 pages, ISBN 0-937175-30-7

The *lint* program checker has proven time and again to be one of the best tools for finding portability problems and certain types of coding errors in C programs. *lint* verifies a program or program segments against standard libraries, checks the code for common portability errors, and tests the programming against some tried and true guidelines. *Linting* your code is a necessary (though not sufficient) step in writing clean, portable, effective programs. This book introduces you to *lint*, guides you through running it on your programs, and helps you interpret *lint*'s output.

Order Number: 30-7, \$12.95



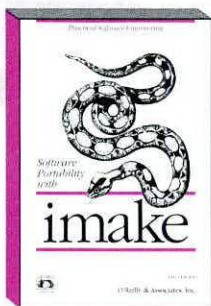
Managing Projects with make

By Andrew Oram & Steve Talbott
2nd Edition October 1991
152 pages, ISBN 0-937175-90-0

make is one of UNIX's greatest contributions to software development, and this book offers the clearest description of *make* ever written. Even the smallest software project typically involves a number of files that depend upon each other in various ways. If you modify one or more source files, you must relink the program after recompiling some, but not necessarily all, of the sources.

make greatly simplifies this process. By recording the relationships between sets of files, *make* can automatically perform all the necessary updating. This book describes all the basic features of *make* and provides guidelines on meeting the needs of large, modern projects.

Order Number: 90-0, \$17.95

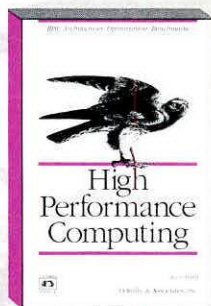


Software Portability with *imake*

By Paul DuBois
1st Edition July 1993
390 pages, ISBN 1-56592-055-4

This Nutshell Handbook®—the only book available on *imake*—is ideal for X and UNIX programmers who want their software to be portable. The book is divided into two sections. The first section is a general explanation of *imake*, X configuration files, and how to write and debug an *Imakefile*. The second section describes how to write configuration files and presents a configuration file architecture that allows development of coexisting sets of configuration files. Several sample sets of configuration files are described and are available free over the Net.

Order Number: 055-4, \$27.95



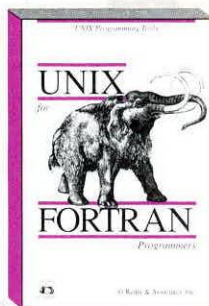
High Performance Computing

By Kevin Dowd
1st Edition June 1993
398 pages, ISBN 1-56592-032-5

Even if you never touch a line of code, *High Performance Computing* will help you make sense of the newest generation of workstations. A must for anyone who needs to worry about computer performance, this book covers everything, from the basics of modern workstation architecture, to structuring benchmarks, to squeezing more performance out of critical applications. It also explains what a good compiler can do—and what you have to do yourself. The author also discusses techniques for improving memory access patterns and taking advantage of parallelism.

Another valuable section of the book discusses the benchmarking process, or how to evaluate a computer's performance.

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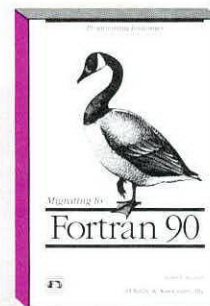


UNIX for FORTRAN Programmers

By Mike Loukides
1st Edition August 1990
264 pages, ISBN 0-937175-51-X

UNIX for FORTRAN Programmers provides the serious scientific programmer with an introduction to the UNIX operating system and its tools. The intent of the book is to minimize the UNIX entry barrier and to familiarize readers with the most important tools so they can be productive as quickly as possible. Shows readers not just how to use a tool such as *make* or *rcs*, but how to use it in program development and how it fits into the toolset as a whole.

Order Number: 51-X, \$24.95



Migrating to Fortran 90

By James F. Kerrigan
1st Edition November 1993
389 pages, ISBN 1-56592-049-X

Many Fortran programmers do not know where to start with Fortran 90. What is new about the language? How can it help them? How does a programmer with old habits learn new strategies?

This book is a complete overview of the new features that Fortran 90 has brought to the Fortran standard, with examples and suggestions for use. It discusses older ways of solving problems and contrasts them with the new ways provided by Fortran 90.

Topics include array sections, modules, file handling, allocatable arrays and pointers, and numeric precision. Two dozen examples of full programs are interspersed within the text, which includes over 4,000 lines of working code.

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Software Portability with *imake* and Managing Projects with *make*

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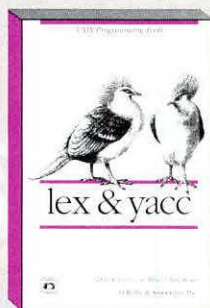
lex & yacc

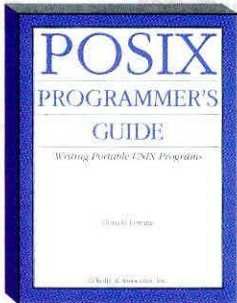
By John Levine, Tony Mason & Doug Brown
2nd Edition October 1992
366 pages, ISBN 1-56592-000-7

This book shows programmers how to use two UNIX utilities, *lex* and *yacc*, in program development. *lex* and *yacc* are tools that help programmers build compilers and interpreters, but they also have a wider range of applications.

The second edition contains completely revised tutorial sections for novice users and reference sections for advanced users.

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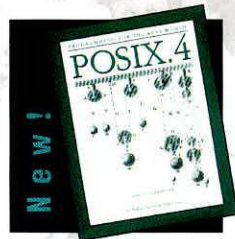
POSIX Programmer's Guide

By Donald Levine
1st Edition April 1991
640 pages, ISBN 0-937175-73-0

Most UNIX systems today are POSIX-compliant because the Federal government requires it for its purchases. Even OSF and UI agree on support for POSIX. Given the manufacturer's documentation, however, it can be difficult to distinguish system-specific features from those features defined by POSIX.

The *POSIX Programmer's Guide*, intended as an explanation of the POSIX standard and as a reference for the POSIX.1 programming library, helps you write more portable programs. This guide is especially helpful if you are writing programs that must run on multiple UNIX platforms. This guide also helps you convert existing UNIX programs for POSIX compliance.

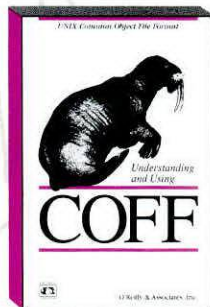
Order Number: 73-0, \$34.95



POSIX.4: Programming for the Real World

This book explains the POSIX.4 standard and the problems software faces interacting with the real world. More information about this book on pages 26 and 54.

Order Number: 074-0, \$29.95 (est.)

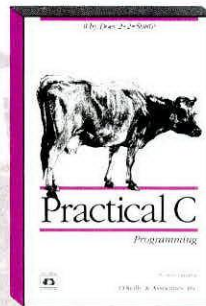


Understanding and Using COFF

By Gintaras R. Gircys
1st Edition November 1988
196 pages, ISBN 0-937175-31-5

COFF, Common Object File Format, is the formal definition for the structure of machine code files in the UNIX System V.3 environment. All machine code files—fully linked executables, compiled applications, or system libraries—are COFF files. There is hardly a system-related task that does not require some knowledge of COFF, from understanding assembly source to implementing a proprietary system enhancement. This handbook explains the COFF data structure and its manipulation.

Order Number: 31-5, \$21.95



Practical C Programming

By Steve Oualline
2nd Edition January 1993
396 pages, ISBN 1-56592-035-X

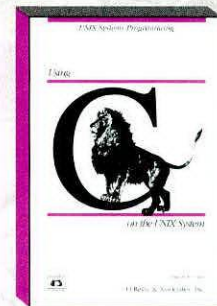
There are lots of introductory C books, but this is the first one that has the no-nonsense, practical approach that has made Nutshell Handbooks® famous. C programming is more than just getting the syntax right. Style and debugging also play a tremendous part in creating programs that run well and are easy to maintain.

Practical C Programming teaches you how to create programs that are easy to read, debug, and maintain. Practical rules are stressed.

Electronic Archaeology, the art of going through someone else's code, is also described.

In this second edition, programs conform to ANSI C. Covers Turbo C (DOS) as well as the UNIX C compiler.

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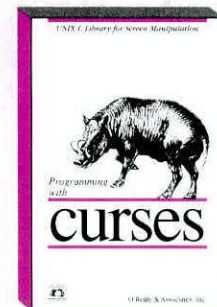


Using C on the UNIX System

By Dave Curry
1st Edition January 1989
250 pages, ISBN 0-937175-23-4

Using C on the UNIX System provides a thorough introduction to the UNIX system call libraries. It is aimed at programmers who already know C, but who want to take full advantage of the UNIX programming environment. If you want to learn how to work with the operating system and to write programs that can interact with directories, terminals, and networks at the lowest level, you will find this book essential. It is impossible to write UNIX utilities of any sophistication without understanding the material in this book.

Order Number: 23-4, \$24.95



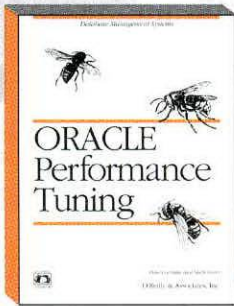
Programming with curses

By John Strang
1st Edition 1986
76 pages, ISBN 0-937175-02-1

Curses is a UNIX library of functions for controlling a terminal's display screen from a C program. It can be used to provide a screen driver for a program (such as a visual editor) or to improve a program's user interface.

This handbook will help you make use of the curses library in your C programs. We have presented ample material on curses and its implementation in UNIX so that you understand the whole as well as its parts.

Order Number: 02-1, \$12.95



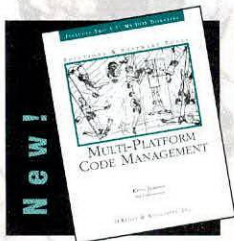
ORACLE Performance Tuning

By Peter Corrigan & Mark Gurry
1st Edition September 1993
642 pages, ISBN 1-56592-048-1

The ORACLE relational database management system is the most popular database system in use today. Organizations ranging from government agencies to small businesses, from large financial institutions to universities, use ORACLE on computers as diverse as mainframes, minicomputers, workstations, PCs, and Macintoshes. Whether you're a manager, a designer, a programmer, or an administrator, there's a lot you can do on your own to dramatically increase the performance of your existing ORACLE system. Whether you are running RDBMS Version 6 or Version 7, you may find that this book can save you the cost of a new machine; at the very least, it will save you a lot of headaches.

Order Number: 048-1, \$34.95

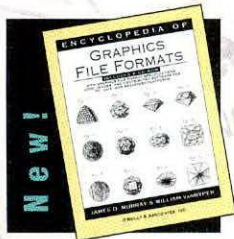
MULTI-PLATFORM PROGRAMMING



Multi-Platform Code Management

▶ A "one-stop" shopping solution for code management problems. Two diskettes contain sources and MS-DOS binaries for both MS-DOS and UNIX. See page 26.

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Encyclopedia of Graphics File Formats

Sure to become a classic for graphics programmers.

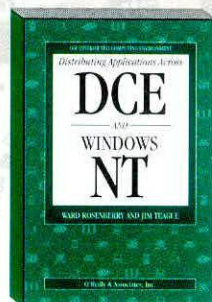
▶ See pages 26 and 66 for details.

Order Number: 058-9, \$59.95

"If you are a graphics programmer who needs to know the details of a format (whether it's big or little-endian, how many colors can be stored, and precisely what data appears in each bit or pixel) or anyone else who needs to deal with the low-level technical details of graphics files, this book is for you."

— Boardwatch, October 1994

About Encyclopedia of Graphics File Formats

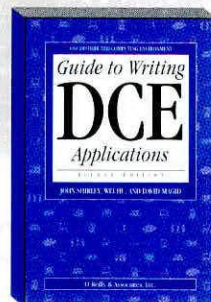


Distributing Applications Across DCE and Windows NT

By Ward Rosenberry & Jim Teague
1st Edition November 1993
302 pages, ISBN 1-56592-047-3

Distributing Applications Across DCE and Windows NT links together two exciting technologies in distributed computing. It shows how to develop an application that simultaneously runs on the Distributed Computing Environment (DCE) and Microsoft systems through remote procedure calls (RPC). The book gives steps for writing a simple, portable application and lists the complete differences between RPC support in the two environments. The programming examples share data processing across UNIX systems hosting DCE, workstations or PCs hosting Windows NT, and PCs hosting MS-DOS with or without 16-bit Windows.

Order Number: 047-3, \$24.95

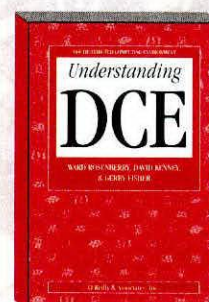


Guide to Writing DCE Applications

By John Shirley, Wei Hu & David Magid
2nd Edition May 1994
462 pages, ISBN 1-56592-045-7

A hands-on programming guide to OSF's Distributed Computing Environment (DCE) for first-time DCE application programmers. This book is designed to help new DCE users make the transition from conventional, nondistributed applications programming to distributed DCE programming. In addition to basic RPC (remote procedure calls), this edition covers object UUIDs and basic security (authentication and authorization). Also includes practical programming examples.

Order Number: 045-7, \$29.95



Understanding DCE

By Ward Rosenberry, David Kenney & Gerry Fisher
1st Edition October 1992
266 pages, ISBN 1-56592-005-8

Understanding DCE is a technical and conceptual overview of OSF's Distributed Computing Environment (DCE) for programmers, technical managers, and marketing and sales people. Unlike many O'Reilly & Associates books, *Understanding DCE* has no hands-on programming elements. Instead, the book focuses on how DCE can be used to accomplish typical programming tasks and provides explanations to help the reader understand all the parts of DCE. In addition to descriptions of each DCE component, topics include guidelines for initial administration and a walk-through of a simple RPC program.

Order Number: 005-8, \$24.95

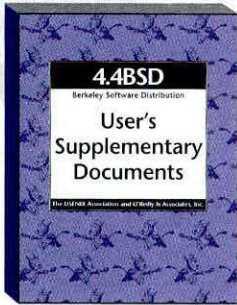


Understanding Japanese Information Processing

By Ken Lunde
1st Edition September 1993
470 pages, ISBN 1-56592-043-0

Understanding Japanese Information Processing provides detailed information on all aspects of handling Japanese text on computer systems. It brings all of the relevant information together in a single book and covers everything from the origins of modern-day Japanese to the latest information on specific emerging computer encoding standards. Appendices provide additional reference material, such as a code conversion table, character set tables, mapping tables, an extensive list of software sources, a glossary, and more.

Order Number: 043-0, \$29.95

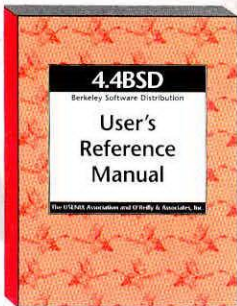


4.4BSD User's Supplementary Documents

By Computer Systems Research Group, UC Berkeley
1st Edition July 1994
712 pages, ISBN 1-56592-076-7

This volume, the *User's Supplementary Documents*, collects papers relating to miscellaneous "user" tools, principally text editors and document processors, and provides in-depth documentation of complex programs such as the shell, editors, and word processing utilities. For many programs, the Supplementary Documents remain the single, authoritative source for detailed documentation.

Order Number: 076-7, \$30.00

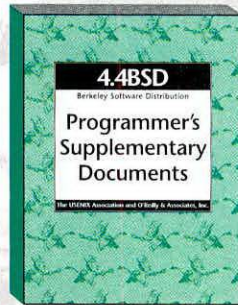


4.4BSD User's Reference Manual

By Computer Systems Research Group, UC Berkeley
1st Edition June 1994
905 pages, ISBN 1-56592-075-9

This volume collects the man pages for the more than 275 user programs that make up the user portion of the 4.4BSD UNIX release—plus additional pages for games and miscellaneous information—and is helpful even if you don't use the BSD version of UNIX. Many of the commands are identical to those in other UNIX versions, as are many of the freeware programs. You may find yourself turning first to this book to look up options for programs like Perl, GNU emacs, compress, patch, g++, or kerberos. This volume is also useful for many related UNIX implementations, including SunOS, BSDI, and Linux.

Order Number: 075-9, \$30.00

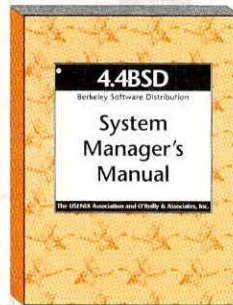


4.4BSD Programmer's Supplementary Documents

By Computer Systems Research Group, UC Berkeley
1st Edition July 1994
596 pages, ISBN 1-56592-079-1

This volume contains the original Bell and BSD research papers, providing in-depth documentation of the programming environment, plus up-to-date papers on new features of 4.4BSD. You'll find papers on gdb and adb debuggers, source code control systems RCS and SCCS, *lex* and *yacc*, and the m4 macro processor—as well as Dennis Ritchie and Ken Thompson's classic first paper about UNIX and Kernighan and Ritchie's intro to UNIX programming. On a more up-to-date note, this book also includes a two-part tutorial on interprocess communication (IPC) under 4.4BSD UNIX.

Order Number: 079-1, \$30.00



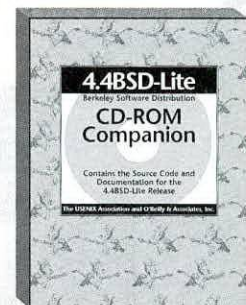
4.4 BSD System Manager's Manual

By Computer Systems Research Group, UC Berkeley
1st Edition June 1994
804 pages, ISBN 1-56592-080-5

Original UNIX papers, terse—but, incredibly precise—often remain the definitive work on the topics they cover. This volume includes man pages for system administration commands (section eight of the online reference manual), plus supplementary documents useful to system administrators. You'll find installation instructions for the 4.4BSD release (which are also included with the 4.4BSD-lite CD-ROM companion), plus papers on many system administration utilities and tasks.

While some of these papers have been superseded by in-depth books, many remain the authoritative source, and all are of interest to serious UNIX administrators.

Order Number: 080-5, \$30.00



4.4BSD-Lite CD-ROM Companion

By Computer Systems Research Group, UC Berkeley
1st Edition June 1994
Domestic Edition: 112 pages
ISBN 1-56592-081-3 (Domestic CD)
International Edition (release pending):
112 pages, ISBN 1-56592-092-9 (International CD)

This CD is a copy of the University of California, Berkeley's 4.4BSD-Lite release, with additional documentation and enhancements. Access to the source code included here will provide invaluable information on the design of a modern UNIX-like system, and the source code for the utilities and support libraries will greatly enhance any programmer's toolkit. The source code for a small number of utilities and files (including a few from the operating system) were removed so that the system could be freely distributed.



Order Numbers:

Domestic Edition: 081-3, \$40.00

International Edition: 092-9, \$40.00

Sets

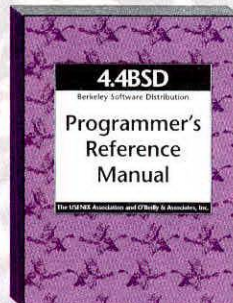
A five-volume doc set is available from O'Reilly with or without CD-ROM:

Volumes 1-5 plus CD-ROM

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Volumes 1-5 only

Order Number: 077-5, \$120 (US)



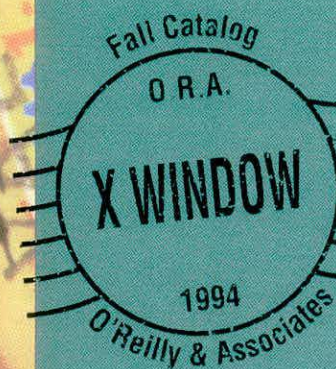
4.4BSD Programmer's Reference Manual

By Computer Systems Research Group, UC Berkeley
1st Edition June 1994
886 pages, ISBN 1-56592-078-3

This reference volume collects the man pages for the various UNIX programming libraries, plus related information for programmers. It consists of sections two through five of the online man page collection: (2) UNIX System Calls; (3) C Library Subroutines; (4) Special Files (device interfaces); (5) File Formats.

The information in this volume is useful not just for 4.4BSD systems, but also for many related UNIX implementations, including SunOS, BSDI, and Linux.

Order Number: 078-3, \$30.00



Two years of development have gone into R6, the newest release of the X Consortium (which recently separated from MIT to become an independent organization). R6 was released to the public in source form in May, and most major vendors plan to release R6 products in early- to mid-1995.

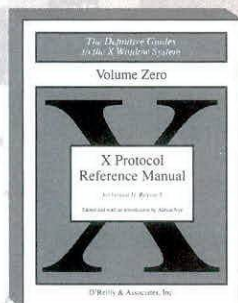
Our plan for documenting the R6 release is much the same as it was for R5. We will first publish an R6 update book for programmers, which is an update for Volumes One, Two, Four, and Five. This explains the new features separately, assuming you know R5, and allows owners of the books to buy one new book instead of four. We plan to have the R6 update released in early 1995.

Then, once R6 is being shipped by most companies, we'll incorporate the material from the R6 update book into Volumes One to Five. Volumes Three and Eight will be updated as soon as the authors are free from other projects. (See the X department in ora.com for a detailed description of R6 updates.)

In addition, this fall we are releasing a companion CD-ROM for R6 that includes precompiled binaries of MIT X11R6 core software for a number of platforms. See page 24 in this catalog for details.

—Adrian Nye

Adrian Nye is the author or editor of several volumes in the X Window System series from O'Reilly. He specializes in X programming, and is O'Reilly's representative to the X Consortium.

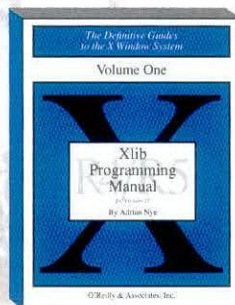


Volume 0: X Protocol Reference Manual

Edited by Adrian Nye
4th Edition November 1994 (est.)
490 pages (est.), ISBN 1-56592-083-X

This manual describes the X Network Protocol, which underlies all software for Version 11 of the X Window System. It not only provides a practical demonstration of what is involved in a client session, but also an extensive set of reference pages for each protocol request and event. Reference pages, alphabetized for easy access, include encoding of requests and replies. The fourth edition of the *X Protocol Reference Manual* includes protocol clarifications of X11 Release 6, as well as the most recent version of the ICCCM and the Logical Font Conventions Manual. For use with any release of X.

Order Number: 083-X, \$34.95 (est.)



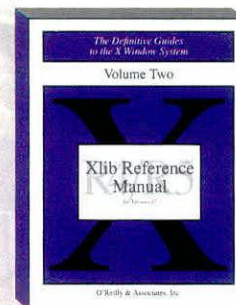
Volume 1: Xlib Programming Manual

By Adrian Nye
3rd Edition July 1992
824 pages, ISBN 1-56592-002-3

Updated to cover X11 Release 5, the *Xlib Programming Manual* is a complete programming guide to the X library (Xlib), the lowest level of programming interface to X. In addition to explaining how to handle the concepts involved in Xlib programming—such as events, graphics, and window management—this guide presents examples of both simple and complete client applications. Includes introductions to internationalization, device-independent color, font service, and scalable fonts.

This manual is a companion to Volume 2, *Xlib Reference Manual*.

Order Number: 002-3, \$34.95



Volume 2: Xlib Reference Manual

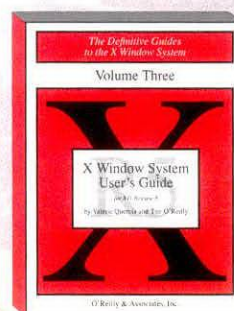
By Adrian Nye
3rd Edition June 1992
1138 pages, ISBN 1-56592-006-6

Volume 2, *Xlib Reference Manual*, is a complete programmer's reference for Xlib, updated for X11 Release 4 and Release 5.

New features in the third edition include:

- Over 100 new manpages covering Xcms, internationalization, and the function versions of macros
- Updating to the R5 spec
- New "Returns" sections on all the functions which return values, making this information easier to find

Order Number: 006-6, \$34.95



Volume 3: X Window System User's Guide

Standard Edition
By Valerie Quercia & Tim O'Reilly
4th Edition May 1993
836 pages, ISBN 1-56592-014-7

The *X Window System User's Guide* orients the new user to window system concepts and provides detailed tutorials for many client programs, including the *xterm* terminal emulator and window managers. Building on this basic knowledge, later chapters explain how to customize the X environment and provide sample configurations.

The *Standard Edition* uses the *twm* manager in most examples and illustrations. Revised for X11 Release 5. (Also see Volume 3M description.)

Order Number: 014-7, \$34.95

This year UNIX marks its 25th anniversary. We think that's something to celebrate. After all, we owe our livelihood to UNIX. Over the years it's given us plenty to explore, learn, teach, and talk about. It's enabled us to do good work—work that's filled with adventure, fun, and creative challenge. We couldn't ask for much more than that. Except, of course, for a little cake and ice cream.

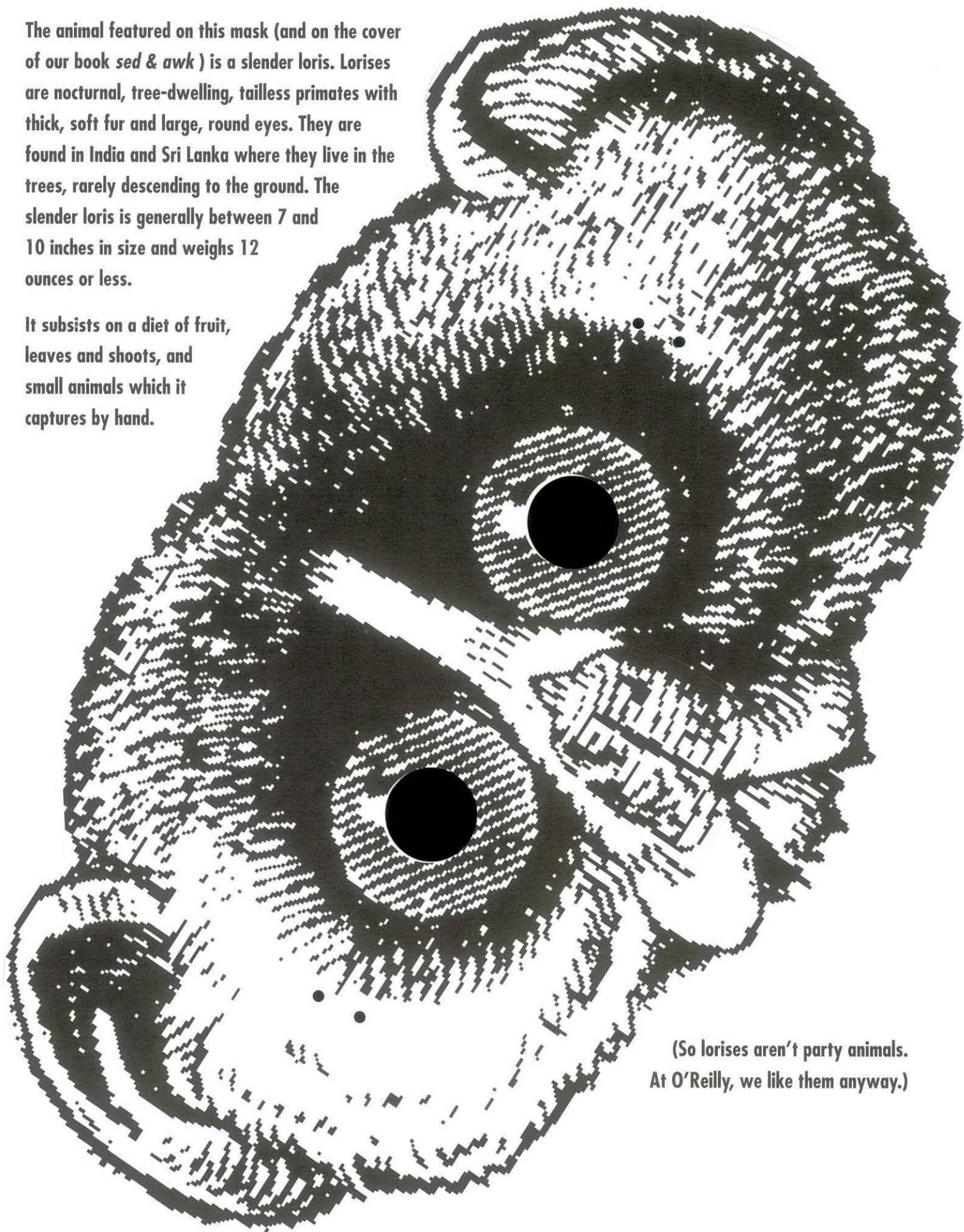
So, put on your party mask and

join the celebration!

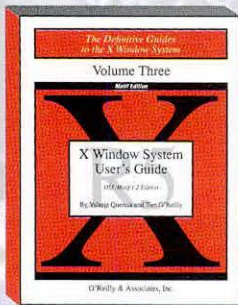


The animal featured on this mask (and on the cover of our book *sed & awk*) is a slender loris. Lorises are nocturnal, tree-dwelling, tailless primates with thick, soft fur and large, round eyes. They are found in India and Sri Lanka where they live in the trees, rarely descending to the ground. The slender loris is generally between 7 and 10 inches in size and weighs 12 ounces or less.

It subsists on a diet of fruit, leaves and shoots, and small animals which it captures by hand.



(So lorises aren't party animals.
At O'Reilly, we like them anyway.)



Volume 3M: X Window System User's Guide

Motif Edition

By Valerie Quercia & Tim O'Reilly

2nd Edition January 1993

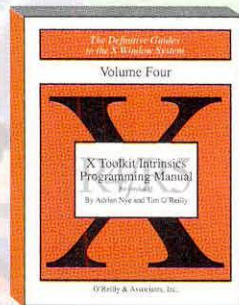
956 pages, ISBN 1-56592-015-5

This alternative edition of the *User's Guide* is revised for Motif 1.2 and X11 Release 5. It highlights the Motif window manager and graphical interface, including such new features as tear-off menus and drag-and-drop. It will be the first choice for users with the Motif graphical user interface.

Material covered in the second edition (also covered in Volume 3, *Standard Edition*):

- Overview of the X Color Management System (Xcms)
- Creating your own Xcms color database
- Tutorials for two "color editors": *xcoloredit* and *xtci*
- Using the X font server
- Tutorial for *editres*, a resource editor
- Extensive coverage of the new implementations of *bitmap* and *xmag*
- Overview of internationalization features
- Features common to Motif 1.2 applications: tear-off menus and drag-and-drop

Order Number: 015-5, \$34.95



Volume 4: X Toolkit Intrinsics Programming Manual

Standard Edition

By Adrian Nye & Tim O'Reilly

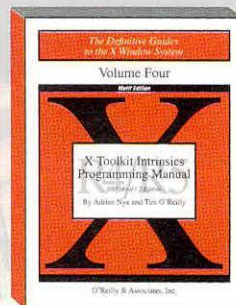
3rd Edition April 1993

567 pages, ISBN 1-56592-003-1

A complete guide to programming with the X Toolkit Intrinsics, the library of C language routines that facilitates the design of user interfaces with reusable components called widgets. This book provides concepts and examples that show how to use the various X Toolkit routines. The first few chapters are devoted to using widgets; the remainder of the book covers the more complex task of writing new widgets.

Volume 4 is available in two editions. The *Standard Edition*, updated for R5, uses Athena widgets to demonstrate how to use existing widgets, but still provides a good introduction to programming with any widget set based on Xt.

Order Number: 003-1, \$34.95



Volume 4M: X Toolkit Intrinsics Programming Manual

Motif Edition

By Adrian Nye & Tim O'Reilly

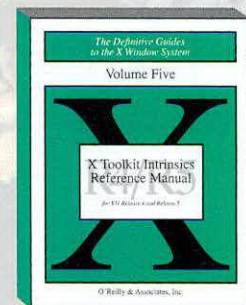
2nd Edition August 1992

674 pages, ISBN 1-56592-013-9

The *Motif Edition* of Volume 4 uses the Motif 1.2 widget set in examples and covers X11 Release 5.

This book is designed to be used with Volume 5, *X Toolkit Intrinsics Reference Manual*, which provides reference pages for each of the Xt functions, the widget classes defined by Xt, and the Athena widget set.

Order Number: 013-9, \$34.95



Volume 5: X Toolkit Intrinsics Reference Manual

Edited by David Flanagan

3rd Edition April 1992

916 pages, ISBN 1-56592-007-4

The *X Toolkit Intrinsics Reference Manual* is a complete programmer's reference for the X Toolkit. This volume is based on Xt documentation from the X Consortium and has been re-edited, reorganized, and expanded for X11 Release 5. It provides reference pages for each of the Xt functions, as well as the widget classes defined by Xt and the Athena widgets, and many useful appendices.

This manual is a companion to Volume 4, *X Toolkit Intrinsics Programming Manual*.

Order Number: 007-4, \$34.95

"For programmers and people who like to understand the full gory detail of how things work, I must recommend the O'Reilly series of X books."

— Peter Collinson, SunExpert Magazine

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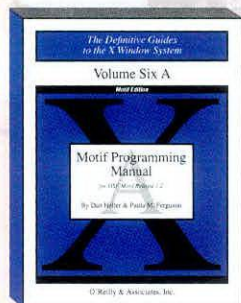
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Volume 6A: Motif Programming Manual

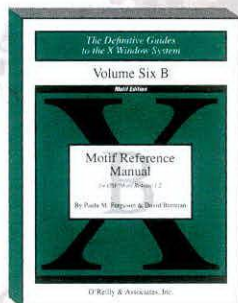
By Dan Heller, Paula Ferguson & David Brennan
2nd Edition February 1994
1016 pages, ISBN 1-56592-016-3

The *Motif Programming Manual* is a source for complete, accurate, and insightful guidance on Motif application programming. There is no other book that covers the ground as thoroughly or as well as this one.

The *Motif Programming Manual* describes how to write applications using the Motif toolkit from the Open Software Foundation (OSF).

In addition to information on Motif, the book is full of tips about programming in general and about user interface design. It includes a tutorial on UI; coverage of drag-and-drop, tear-off menus, and internationalization as implemented in the Motif widgets such as Text and TextField; plus the entire book has been checked for accuracy with Motif 1.2 (while remaining usable with Motif 1.1). Complements Volume 6B, *Motif Reference Manual*.

Order Number: 016-3, \$34.95



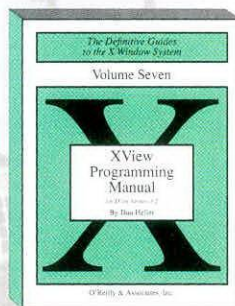
Volume 6B: Motif Reference Manual

By Paula Ferguson & David Brennan
1st Edition June 1993
920 pages, ISBN 1-56592-038-4

The *Motif Reference Manual* is a complete programmer's reference for the Motif toolkit from the Open Software Foundation (OSF). Motif has become the standard user interface for X Window System applications, and the Motif toolkit makes it easy for programmers to build applications that conform with the Motif "look and feel."

This book provides reference pages for the Motif functions and macros, the Motif and Xt widget classes, the Mrm functions, the Motif clients, and the UIL file format, data types, and functions. The reference material has been expanded from the appendices of the first edition of Volume 6 and covers Motif 1.2. This book is designed to be used with Volume 6A, *Motif Programming Manual*, which describes how to build applications using the Motif toolkit and provides a complete tutorial with programming examples.

Order Number: 038-4, \$34.95



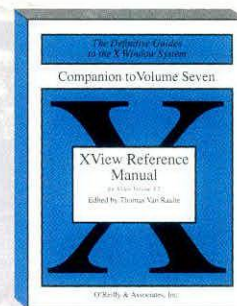
Volume 7A: XView Programming Manual

By Dan Heller
Updated by Thomas Van Raalte
3rd Edition September 1991
(latest update August 1993)
770 pages, ISBN 0-937175-87-0

The *XView Programming Manual* has been revised and expanded for Version 3 of XView, the poor-man's object-oriented toolkit for building OPEN LOOK applications for X. Describing both the concepts and the technical approaches behind XView, the *XView Programming Manual* is perfect for the beginner breaking into X programming.

The Attribute Summary from the previous edition of the *XView Programming Manual* has been expanded and is now published as a companion volume, the *XView Reference Manual*. It contains alphabetical listings of XView attributes, functions, and macros, as well as other reference information essential for XView programmers.

Order Number: 87-0, \$34.95



Volume 7B: XView Reference Manual

Edited by Thomas Van Raalte
1st Edition September 1991
(latest update August 1993)
311 pages, ISBN 0-937175-88-9

The *XView Reference Manual* has been expanded from the Attribute Summary of the previous edition of the *XView Programming Manual* and is now published as a companion volume. The XView toolkit provides extensive attribute-value pair combinations, convenience routines and object class hierarchies that are too voluminous to memorize without the aid of this comprehensive reference guide. It contains alphabetical listings of XView attributes, functions, and macros, as well as other reference information essential for XView programmers. A must-have companion for the *XView Programming Manual*.

Order Number: 88-9, \$24.95

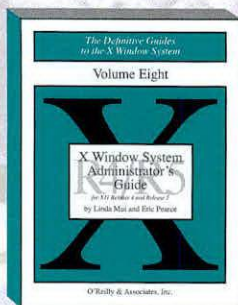
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Volume 7A: XView Programming and Volume 7B: XView Reference

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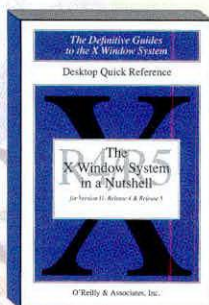
Volume 8: X Window System Administrator's Guide

By Linda Mui & Eric Pearce
1st Edition October 1992
372 pages, ISBN 0-937175-83-8

As X moves out of the hacker's domain and into the "real world," users can't be expected to master all the ins and outs of setting up and administering their own X software. That will increasingly become the domain of system administrators. Even for experienced system administrators X raises many issues, both because of subtle changes in the standard UNIX way of doing things and because X blurs the boundaries between different platforms. Under X, users can run applications across the network on systems with different resources (including fonts, colors, and screen size). Many of these issues are poorly understood, and the technology for dealing with them is in rapid flux.

This book is the first and only book devoted to the issues of system administration for X and X-based networks, written not just for UNIX system administrators, but for anyone faced with the job of administering X (including those running X on stand-alone workstations).

Order Number: 83-8, \$29.95



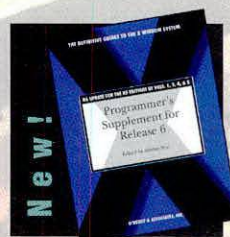
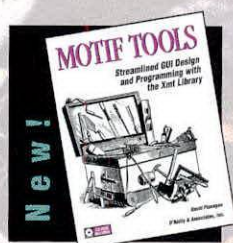
The X Window System in a Nutshell

Edited by Ellie Cutler, Daniel Gilly
& Tim O'Reilly
2nd Edition April 1992
424 pages, ISBN 1-56592-017-1

An indispensable companion to the *X Window System* series. Once programmers have mastered the concepts behind X and learned how to program in Xlib and Xt, there is still a mass of details to remember. *The X Window System in a Nutshell* fills this gap. Experienced X programmers can use this single-volume desktop companion for most common questions, keeping the full *X Window System* series of manuals for detailed reference. *X in a Nutshell* contains essential information in a boiled-down quick-reference format that makes it easy to find the answers needed most often.

This book has been updated to cover R5, but is still useful for R4. The descriptions of the functions have been expanded and clarified, with improved cross-referencing to important related functions. Includes material on Xcms and the internationalization features of R5.

Order Number: 017-1, \$9.95



Programmer's Supplement for Release 6

By Adrian Nye
1st Edition January 1995 (est.)
300 pages (est.), ISBN 1-56592-089-9

For programmers who are familiar with Release 5 of the X Window System and who want to know how to use the new features of Release 6. This book, intended as an update for owners of Volumes One, Two, Four, and Five of the *X Window System* series, provides complete tutorial and reference information to all new Xlib and Xt toolkit functions. See page 27.

Order Number: 089-9, \$24.95 (est.)

New CD-ROM

The X Companion CD for R6

1st Edition October 1994 (est.)
CD-ROM plus 80-page guide
ISBN 1-56592-084-8

Every X programming site needs access to X core and contrib source. It's all here—in one convenient CD. No need to tie up disk space if you have this CD on your shelf.



See page 24 for more information.

Order Number: 084-8, \$29.95 (est.)

Motif Tools

By David Flanagan
1st Edition August 1994
1024 pages, ISBN 1-56592-044-9

"My aim was to put programmer ease-of-use first and create a library that really simplifies GUI development."

—David Flanagan, author of
Motif Tools and the Xmt library

Comes with an Xmt programming library on CD-ROM. The library contains nine custom widgets and over 250 convenience routines. See page 27 of the catalog and the X Department in ora.com.

Order Number: 044-9, \$54.95

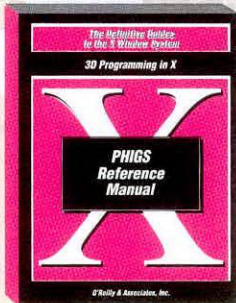
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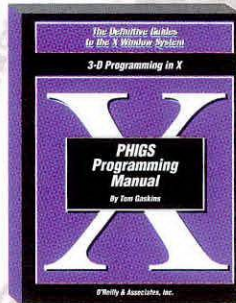
PHIGS Reference Manual

Edited by Linda Kosko
1st Edition October 1992
1116 pages, ISBN 0-937175-91-9

The *PHIGS Reference Manual* is the definitive and exhaustive reference documentation for the PHIGS graphical programming language. It contains complete reference pages for all the language functions, along with additional reference materials. Both PHIGS and PHIGS PLUS are included, and the documentation is faithful to the international standards. Therefore, this book also serves as documentation for the many commercial products based on the standards.

Together with the *PHIGS Programming Manual*, this book is the most complete and accessible documentation currently available for the PHIGS and PHIGS PLUS standards.

Order Number: 91-9, \$39.95



PHIGS Programming Manual

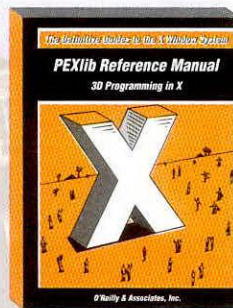
By Tom Gaskins
1st Edition February 1992
Softcover: 968 pages, ISBN 0-937175-85-4
Hardcover: 968 pages, ISBN 0-937175-92-7

A complete and authoritative guide to PHIGS and PHIGS PLUS programming, this book documents the PHIGS and PHIGS PLUS graphics standards and provides full guidance regarding the use of PHIGS within the X environment. The discussions of PHIGS and PHIGS PLUS are fully integrated in this text, which takes as its starting point the PEX Sample Implementation (or PEX-SI)—the publicly available and most widely established base for commercial PHIGS products. In addition, the *PHIGS Programming Manual* explains, at both elementary and advanced levels, how to integrate your PHIGS applications with standard X (Xlib) functions. Besides Xlib itself, there are detailed examples and explanations based on the Motif, OLIT, and XView toolkits.

Whether you are starting out in 3D graphics programming or are a seasoned veteran looking for an authoritative work on a fast-rising 3D graphics standard, this book will serve your purposes well.

New Low Price (Was \$52.95)

Order Numbers: 92-7, \$42.95



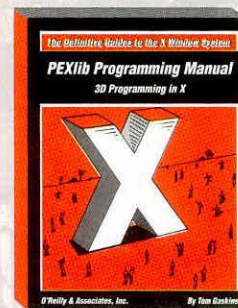
PEXlib Reference Manual

Edited by Steve Talbott
1st Edition December 1992
577 pages, ISBN 1-56592-029-5

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By Tom Gaskins
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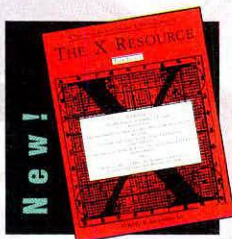
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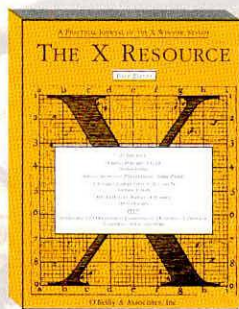


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► On page 27 you'll find an overview of what's contained in this new issue of *The X Resource*.

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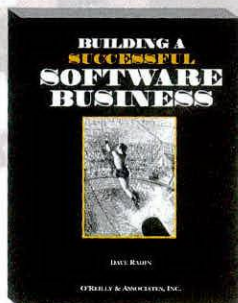
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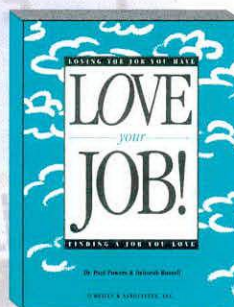
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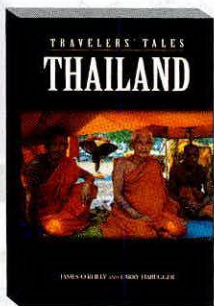
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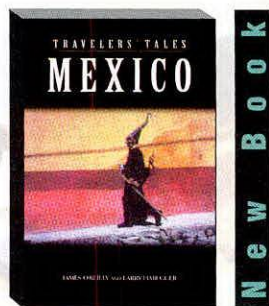
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1st Edition December 1993
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Thailand, one of the most intriguing travel destinations of the nineties, should satisfy just about any traveler's hunger for the exotic, the beautiful, the thrillingly different. A country of contrasts, Thailand is a microcosm of all that is right and wrong with tourism, including the traveler's role as pilgrim, adventurer, and consumer.

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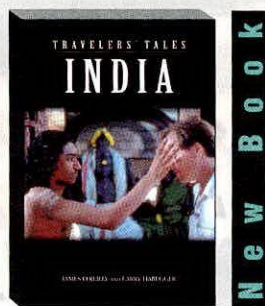
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Edited by James O'Reilly & Larry Habegger
1st Edition August 1994
426 pages, ISBN 1-885211-00-7

Mexico, so prone to stereotyping, is one of the most deceptively complex countries in the world. "Melting pot," a phrase most often applied to the US, is applicable in a deeper way to Mexico's towering and ancient layering of civilizations, which continues to this day in a swirling crosscurrent of indigenous peoples, multiple languages, dialects, riotous art and music, religions behind religions, hidden cosmologies, uncounted ruins, and secret knowledge. We forget just how old Mexico is.

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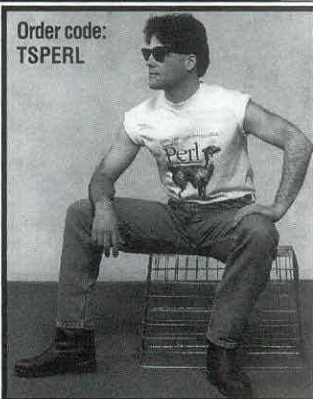
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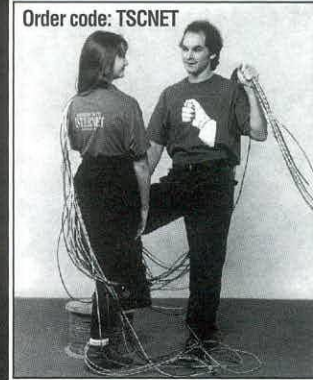
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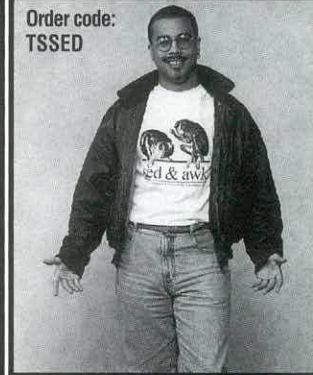
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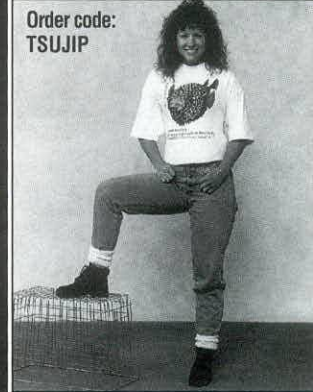
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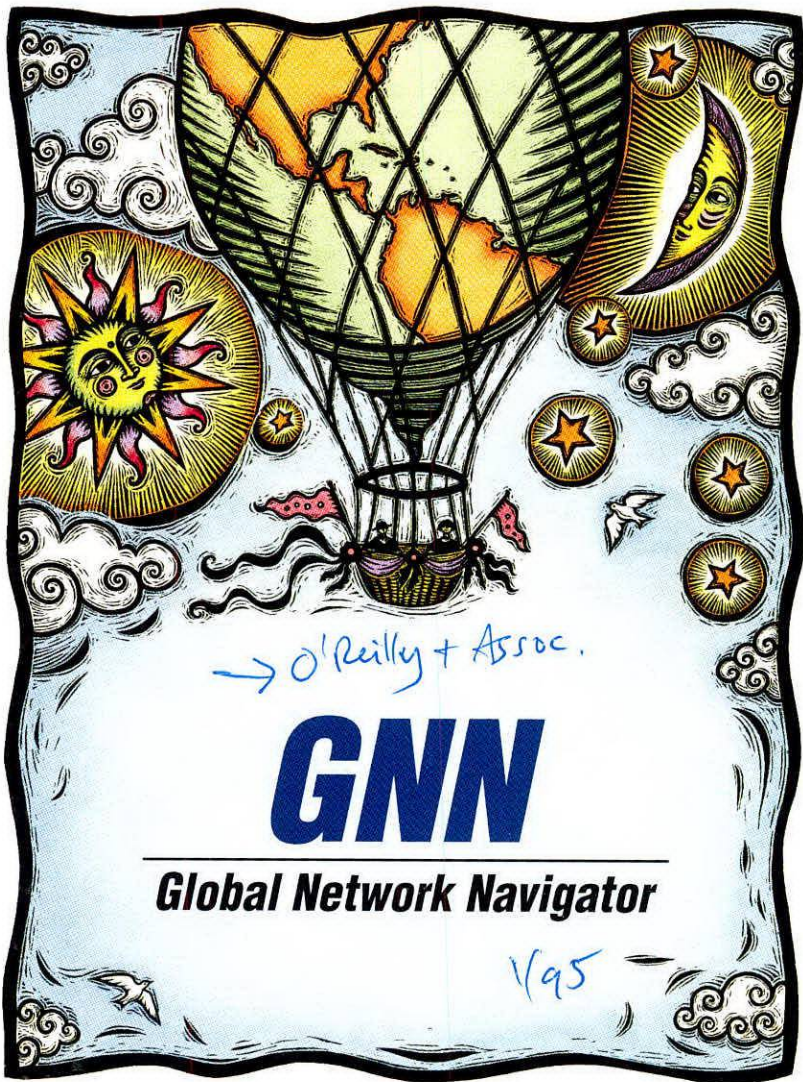


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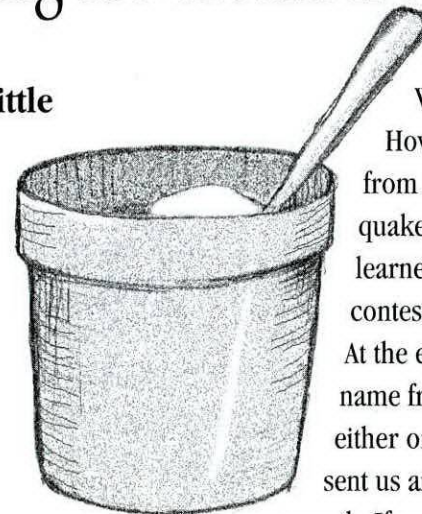
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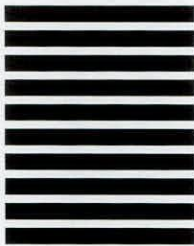


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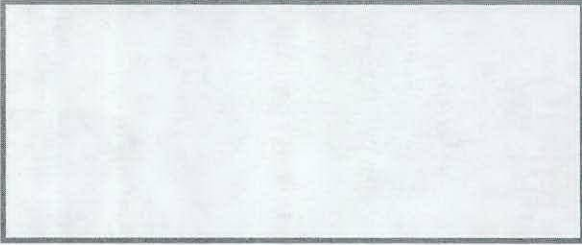


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Programming

REAL-TIME APPLICATIONS

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Our new guide to POSIX.4 covers the nuts-and-bolts of the POSIX.4 standard in practical, often humorous, terms, and shows clearly how to solve real-world programming problems. It's a must-read if you're at all interested in real-time applications.

POSIX.

By Andrian Nye

Real-time programming has been kicking around for years; it conjures up all sorts of exotic images, like "smart bombs," missile guidance processors, "heads up" control systems for fighter pilots, and so on. However, like most exotic technology, real-time programming is gradually coming closer to the world we actually live in.

Did I say "gradually"? I misspoke; it's already here. If you've bought a car within the last decade, it probably has a dozen computers on board, running everything from the brakes to the ignition system. There are microprocessors inside VCRs, stereos, and even heating systems. Of course, video games are computer based—for that matter, so's the latest generation of "old-fashioned" pinball machines. There's hardly a device in your house that doesn't have some kind of computer inside it.

THE REAL WORLD OF REAL TIME

So, then, what is real time? Bill Gallmeister calls real-time programming "Real World" programming, because it's about software that has to interact with the real world in some way. The real world brings a lot of constraints that many computer applications, like word processors, just don't face. There are many constraints, but the most important of these is time: real-world problems face deadlines.

If a computer doesn't meet a deadline, something VERY BAD happens: a car crashes into a wall, or a jet airliner explodes. Even in less drastic cases, if it takes an extra minute to make your airline reservation or total up your grocery bill at the checkout counter, someone is going to be annoyed and start considering other banks or supermarkets. In a multimedia application, the sound or the pictures will get garbled—and your potential customers will politely consider their alternatives. In real-world programming deadlines are important, and the computer has to meet those deadlines—with no excuses about an "abnormally heavy load."

REAL-WORLD CONSTRAINTS

The real world brings other constraints, too. You can bet that the brake processor in your car isn't a state-of-the-art 150 MHz RISC chip. That chip is too expensive, dissipates too much heat, requires too much power, isn't "reliable" enough for a life-and-death application, and wouldn't survive in a car chassis. It's more likely to be a very slow, but very well-known and very reliable, processor from the early '80s. Real world isn't about meeting deadlines by being "fast"; it's about meeting deadlines on hardware that may be very slow, because it also has to meet the constraints of economics and reliability.

THE POSIX.4 STANDARD

By defining the services that a real-world application can expect from the operating system, POSIX.4 makes it easier (though not necessarily simple) to port an application from one environment to another. It doesn't solve all the problems—but at least it defines standard ways of doing the basic things real-world software needs to do, like interprocess communication, asynchronous I/O, and priority-based scheduling. By standardizing these (and other) services, POSIX allows you to worry about the real portability problems ("this processor is a lot faster, but its interrupt latency is horrendous"), rather

Bill O. Gallmeister has been writing operating system software for an alarming number of years. He can now be found at First Virtual Corporation, doing high-velocity file system work for a networked monster multimedia machine.

POSIX.4 Programming for the Real World

*By Bill Gallmeister
1st Edition November 1994 (est.)
400 pages (est.)
ISBN 1-56592-074-0
\$29.95 (est.) See catalog page 26 for details.*

4. REAL-WORLD PROGRAMMING

So there's real-world programming all around us. Particularly if you include transaction processing and new multimedia applications, there are probably more programmers working on real-world software than there are on "traditional" computer applications like compilers and word processors!

Traditionally, real-time software has run on many different small, lightweight, product-specific operating systems—if there's been an operating system at all. As a result, it has been very difficult to port a real-time program from one environment to another; often you just had to rewrite the application from scratch. And that's painful. Although real-world software often runs on very old hardware, we're still in an age where virtually any software will outlive the hardware it runs on. Sooner or later, you're going to have to take that brake controller and port it to—well, if not a Power PC, at least an i960. It's also really convenient to develop your brake controller on one platform—which might look an awful lot like a familiar UNIX machine, with lots of amenities like compilers and debuggers—and after you've gotten it more-or-less working, download it to the real target, which may be a simple board where the only I/O device is hydraulic. Historically, that's another luxury few real-time programmers have had.

than spending many hours rewriting the program so it runs in an environment that's "almost the same, but different."

Bill's book on the POSIX.4 standard is much more than your typical standards book. It's a complete introduction to real-world programming, in light of POSIX.4. It doesn't just explain the standard; it tells you the problems that real-world programs face and describes how these problems are solved. It doesn't just tell you "this is how to send POSIX.4 extended signals"—it tells you why you need extended signals, what problems they solve, what problems they don't solve, and where they fit into the larger picture of interprocess coordination and communication. In addition, Bill tells you why the POSIX committee made many of its decisions. And even though he was vice-chairperson of the working group that defined POSIX.4, Bill isn't above telling you when he disagrees with its decisions. Not only that, he's funny.

We're convinced that this book will become the standard reference work on real-world programming. If you see real-time in your future—and that includes areas like multimedia, games, and transaction processing—you'll want to own this book.

Mike Loukides is an editor for O'Reilly & Associates, with a focus on developing titles on UNIX utilities and system administration. He is the author of System Performance Tuning and UNIX for FORTRAN Programmers. Mike's interests are system administration, networking, programming languages, and computer architecture.

If you've bought a car within the last decade, it probably has a dozen computers on board, running everything from the brakes to the ignition system. There are microprocessors inside VCRs, stereos, and even heating systems. There's hardly a device in your house that doesn't have some kind of computer inside it.

continued from page 5

KEEP IT COMING

No other book publisher has ever done so much to help me learn about UNIX and the Internet. Every book I have gotten has been wonderful, from the words inside right down to the cute little animals on most of the covers.

We have a local professor here who does a lot with putting high school kids onto the Internet and on the supercomputer. I got him to pick up a whole ton of *The Whole Internet User's Guide*, 2nd edition, for distribution to all those high school kids. Just hoping to do what little I can to make sure that good quality O'Reilly books and ideas like GNN and Internet In A Box keep coming out.

—Matt Midboe

P.S. Without all the ORA books I've purchased I wouldn't have had a clue how to put together the server that I'm using right now to send this email to you! :)

ROCK 'N ROLL

As a GNN subscriber, I haven't understood what you were about until I received your catalog/mag. Sometimes we just need something to hold in our hands. Glad to see Wyoming's rock 'n roll cattle rancher John Perry Barlow is included in your publication.

—Randy Bunney

Don't miss the article by John Perry Barlow beginning on page 65.

OH, MY

I was Shocked! Shocked! to see your graphic say, "What's next!? 'I saw Elvis on the Internet?'" Haven't you seen the home page for The American South Internet Resource Center?

http://sunsite.unc.edu/doug_m/pages/south/south.html

Great mag. Keep it up.

—Paul D. Gillen

IN THE PAST

I just received your Summer 1994 issue of *ora.com* and I am very impressed with the layout and the articles. Would it be possible to obtain any earlier issues?

—Jeff Breiwick

Sorry, we've run out of back issues, but you can find several articles from previous issues at our Web site and on our Gopher server. Point your Web browser to <http://gnn.com/ora/> or gopher or telnet to gopher.ora.com (telnetters, login as "gopher").

TRUE STORY

I would like to thank you for the very useful information I recently got from *Managing UUCP and Usenet*.

I was performing maintenance on a system we have in the field in what is normally a lights-out location (in Dover, DE). One of the problems I was trying to solve involved setting up UUCP access to the system. I was at the end of my trip, frantically trying to finish up so that I could spend a little time with my parents before flying back to the home office in Dayton. Things weren't going well. I couldn't get the comm settings on the modem to work properly. When I accessed the serial port one way, I got even parity, 7 databits, when I accessed it another way I had to take it to no parity, 8 databits.

I had a call in with the vendor's technical support for the system, but they weren't returning my calls. I dug out my trusty O'Reilly book and there it was on page 35:

"Some UNIX systems use one start bit and one stop bit, eight data bits, and no parity. Others use seven bits, even parity. However, whenever uucico starts up, it automatically switches the line to eight bits, no parity" (emphasis mine).

Bingo! With this simple but vital piece of information I was able to grab some Chesapeake Bay crabs for dinner and visit with my parents before flying back home to Dayton. I didn't hear back from the support line until after I was back home, and even then their info was not as helpful or complete as what I read in your book.

Keep up the good work. System administrators and programmers everywhere appreciate your efforts.

—Andrew Welter

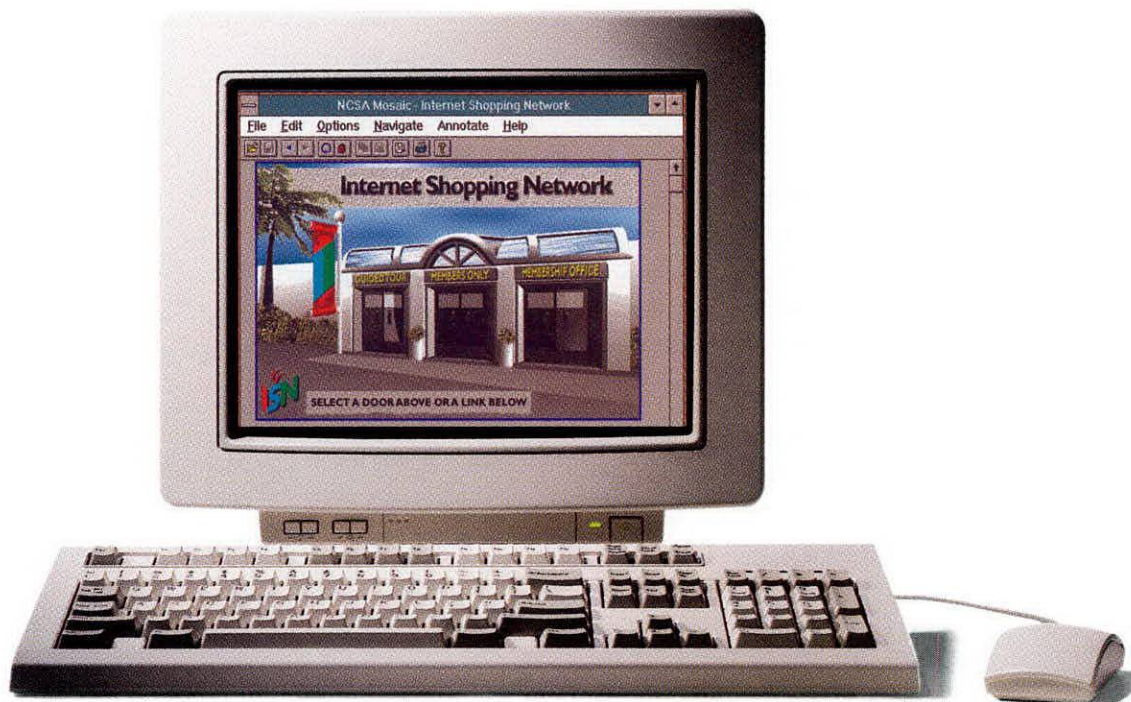
SPECIES SURVIVAL

I just wanted to compliment O'Reilly & Associates on teaming up with the Species Survival Commission. I read about this project in your Feature Articles section on your gopher server in the "Lending a Hand to Lex and Yacc" article. Congratulations on setting a good precedent for businesses and their interaction with the environment I plan to send in my contribution soon.

—David K. Dean

*When you donate to the Species Survival Commission, you help ensure the survival of species such as the Victoria Crowned Pigeon, the beautiful bird on the cover of our book *lex and yacc*. If that's not incentive enough, we're offering a free T-shirt for a donation of \$35 or more, a free *Nutshell Handbook™* (your choice) for a donation of \$100 or more, and ten free O'Reilly books (your choice) for a donation of \$1000 or more. Checks should be made out to IUCN-US and sent either to O'Reilly & Associates, 103A Morris Street, Sebastopol, CA 95472 or to Susan Tressler, Species Survival Commission, IUCN, c/o Chicago Zoological Society, Brookfield, IL 60513. For more information, send email to ssc-project-info@ora.com*





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X Window System

SINCE THE LAST ISSUE OF *ORA.COM*,

we've been busy updating our X products for Release 6 to keep you as current as we can. Here Adrian Nye takes a close look at two R6 features: the session manager, which is analogous to the window manager; and multi-threaded Xt applications, which enable you to write applications with user interfaces that don't hang while the application is busy doing something on the network.

We also feature stories on *Motif Tools* and *X User Tools*. Here you'll find helpful tips that give a taste of these new books. And check out our new issue of *The X Resource*, the journal that keeps you fully up to date on practical aspects of X programming.

In the catalog we cover our other new X products: *Programmer's Supplement for Release 6* (page 27), *Volume 0, X Protocol Reference Manual* (page 44), and *X11 R6 software on CD-ROM*, with binaries for all the major platforms (page 24)—a handy resource for system administrators and programmers alike.

the latest and

By Adrian Nye

X11 R6 introduces quite a few new features, including internalization, signal handling, C++ support, and extension event handling. There's not room here to explain the more specialized features, so we'll mention two that expand X's capabilities in ways everyone will notice and can understand: session management and multi-threading support for Xt applications.

SESSION MANAGEMENT

Probably the most important new feature in Release 6 is support for session management. A session manager has a few basic features:

- The session manager knows about all the applications on the X server (and possibly also non-X programs) and how to restart them, so that if the user logs out and later logs in, the session manager can restart all the applications.

- The session manager can tell applications to save their states; this is called checkpointing. For example, an editor could save the filename it is editing, the file itself, and the current position in the file. Most commonly the session manager orders a save when a session is being shut down because the user is logging out, but it could also be that the user just wants to save all the current work as a backup.
- The session manager lets applications interact with the user one at a time. This is especially helpful during saves, when the applications need to ask the user for information, such as what filename to use. Multiple clients might try to do this at once because the session is shutting down.

Release 6 comes with a session manager, *xsm*, but it was designed only to let the Consortium test all the related software, not as a real session manager. Programmers can use it to test that their applications are session manager compliant. But just as simple session managers based on the pre-R6 session manager support in

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The X Resource

A Timely Guide to X

The X Resource

Edited by Paula M. Ferguson

Fall 1994, 222 pages

ISBN 1-56592-069-4, \$14.95

See catalog page 49 for details.

If you do X programming or manage X programmers, you should be getting *The X Resource*. It's the best place to get practical, in-depth, and up-to-date information on X programming.

Here's some of what you'll find in the Fall issue:

- The XPM Format and Library: A Tutorial and Reference, by Arnaud Le Hors
- The Xmsg Library: An Application-Level Message-Reporting Facility, by Rob Werner
- Event-Free Structured Graphics in the X Environment, by Glenn Pinkerton
- Configuration and Administration of a Scalable X-based UNIX Service, by Richard Hesketh
- An Object-Oriented Approach to Motif 1.2 Drag and Drop, by Harry Danilevsky and Andrew Renalds

the ICCCM (Inter Client Communication Conventions Manual) have been available on the Internet for years, good free R6-compatible session managers will undoubtedly be developed, and a commercial one will most likely be included in some release of CDE (the Common Desktop Environment). Also, the session manager function may be added to some existing window managers.

APPLICATION PROGRAMMING TO SUPPORT THE SESSION MANAGER

Applications need to be modified to allow the session manager to achieve many of its features. For example, the application needs to tell the session manager how to restart the application. Why? Because the application knows best what command is necessary. Also, the application needs to be able to save and restore its own state.

The session manager issues the commands to restart a client on the right machine with the right environment variables, but the client itself must get information from the restart command and use it to restore its own state. For example, the restart command might contain a

command line option that specifies a file in which the application has stored its state.

In X11 R6 the X Toolkit Intrinsics (Xt) support participation in session management using a new widget called SessionShell, which replaces the ApplicationShell widget. Basically the application sends messages to the session manager by setting resources, and the application registers callback functions that are called when the session manager sends a message. Each callback performs the tasks necessary to handle one message. The biggest modification in most clients is the code to save and restore the application's state.

MULTI-THREADING SUPPORT

Most new operating systems now support some form of threads. A thread is a lighter-weight form of a process—the computer's term for each program you run. With threads it's more practical to write programs that have some degree of parallel programming—they do two or more things at once. Threads can work even on systems with only one processor. The processor divides its time since it can't really do two things at once, and to the user it seems as if two things *are* happening at once.

Here's a timely example of why threads are useful. Take Mosaic, the Internet Web browser. If you click on a link, you sit and wait while it gets the document (especially large graphics). Meanwhile, the whole program is completely hung—you can't even page through the file you are looking at! This is a major weakness and annoyance. With threads Mosaic could be rewritten to get new documents in a separate thread, so that you could read the existing document while Mosaic works on getting the next one.

In R6 both Xlib and Xt have been made thread-safe. However, the current release of Motif is based on R5 and is not thread-safe, even though you can compile and run some Motif programs with the R6 Xt library. *Programmer's Supplement for R6* (see page 27) describes in detail how to program to support the session manager and how to program with threads. ■

Adrian Nye is the author or editor of several volumes in the X Window System series from O'Reilly. He specializes in X programming and is O'Reilly's representative to the X Consortium.

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Making Menus with

Motif By David Flanagan

Motif Tools and the Xmt programming library that accompanies it on CD-ROM offer resources to empower Motif programmers and dramatically speed up application development with the X Toolkit and Motif. The Xmt library contains nine custom widgets and more than 250 convenience routines that handle many tricky aspects of GUI programming. David Flanagan, author of both the book and the library, offers a brief look at his custom XmtMenu widget, which radically simplifies Motif menu creation. ▼

A menu bar with its associated pulldown menus is a user interface component common to almost all GUIs. Creating a menu system with the Motif widgets, however, is an annoyingly complex task. First you create the menu bar and add cascade buttons to it. Then you create menu panes as siblings of the cascade buttons and associate one pane with each button. Finally, you add the push buttons, toggle buttons, labels, and separators that you want to each of the menu panes. To set the labels for the widgets, you must create numerous strings; if you want mnemonics and accelerators for the buttons, you must set the appropriate resources, and of course you must register a callback function to be called for each button.

Menus have a repetitive structure, and creating them lends itself well to

automation. The Motif SimpleMenu creation routines added in Motif 1.1 go a long way toward making menu creation easier (their greatest weakness is that they allow only one callback to be specified per menu pane). A common approach, and something you may have tried yourself, is to initialize a static array of structures which describe the menus you want, and write a function which reads those structures and creates the menu panes, buttons, labels, and separators they describe. Once this is done, your main application code need only call this one function to create the application's entire menu system.

Instead of a menu-creation function of this sort, Xmt provides a special XmtMenu widget that serves the same purpose. This Menu widget is a subclass of the XmRowColumn widget, which is the widget used to implement menu bar and menu panes in Motif. The new Menu resource takes an array of structures that describe the items to appear in a menu bar or menu pane and the widget will automatically create the described items.

DESCRIBING A MENU SYSTEM WITH RESOURCES

The real innovation of the Xmt menu creation scheme is that it allows menus to be described through resource files, rather than through more awkward C structures. The example resource file shown below was used to create the accompanying menu system.

Note that there are only four resources in this example; most lines end with a backslash so that the next actual line is parsed as a continuation of the same logical line. The first resource, *menubar.items*, specifies that the menu bar will have three cascade buttons, with labels *File*, *View*, and *Help*. The mnemonic characters for these buttons will be *F*, *V*, and *H*, which are preceded by an underscore character in the menu grammar. These characters will appear underlined in the actual menu. Attached to these buttons will be the menu panes named *file*, *view*, *help*. The description of each menu item is terminated with a semicolon. The *Help* cascade button will appear to the far right of the menu bar because it has the special keyword *Help* in its description, which flags it as the special case help menu. (The Motif style guide specifies that help menus should always appear at the extreme right of the menu bar.)

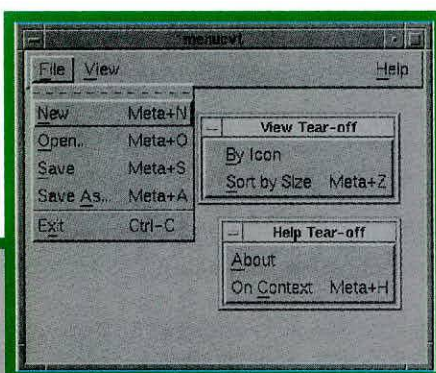
When the Menu widget *menubar* is created, it will read this *XmtNItems* resource and automatically create the three cascade buttons it describes. Since these cascade buttons have attached panes, however, it will also create new Menu widgets for each of these panes. Thus, creating the single top-level menu bar widget will cause the entire menu system to be created. ■

```
*menubar.items: \
Tearoff      "_File" -> file ;\
Tearoff      "_View" -> view ;\
Tearoff Help  "_Help" -> help ;

*menubar*file.items: \
  "_New"      [Meta+N] NewFile();\
  "_Open..." [Meta+O] OpenFile();\
  "_Save"     [Meta+S] SaveFile();\
  "Save _As..." [Meta+A] {GetFilename();\
SaveFile();}\
  --- ; \
  "E_xit"     [Ctrl-C]      Quit();

*menubar*view.items: \
  "_By Icon" | "_By Name" $view_by_name ;\
Off  "_Sort by Size" [Meta+Z] $sort_by_size ;

*menubar*help.items: \
  "_About"                About();\
  "On _Context"           [Meta+H] ContextHelp();
."
```



David Flanagan is a principal of Dovetail Systems, a company that specializes in custom widget development. He has been programming with X and Xt since their early days at MIT and is an expert on the Motif widgets. David is also the author of Programmer's Supplement for R5 and editor of X Toolkit Intrinsics Reference Manual, both from O'Reilly.

Excerpted from:

Motif Tools: Streamlined GUI Design and Programming with the XMT Library

By David Flanagan

1st Edition August 1994

1024 pages, plus CD-ROM

ISBN 1-56592-044-9, \$54.95

See catalog page 27 for details.

Organizing Addresses with xrolodex

By Linda Mui

Among UNIX users it's no secret that running software in an environment with equipment from different vendors can be frustrating. The software runs on the machine it was written for, but you need to recompile the source to run it on another machine. And hey, we're not all programmers, so who needs the hassle?

That's the question we started asking ourselves a couple of years ago when we decided to write UNIX Power Tools. Why not create binaries for all the major platforms for all those nifty tips, tools, and programs we described in the book? If sales of UNIX Power Tools are indicative of our readers' agreement, we were right! You don't want the hassle either.

Our staff writers have done it again with the release of our newest shrink-wrapped programs for people like you and me. X User Tools, by Linda Mui and Valerie Quercia, is chock full of tips, tricks, scripts, techniques, and programs that make the X Window system more enjoyable, more powerful, and easier to use.

X User Tools features programs that range from fun (games, screen savers, and a variety of online clocks), to business tools (calendar, memo, and mailer programs), to graphics (programs for drawing, displaying, and converting

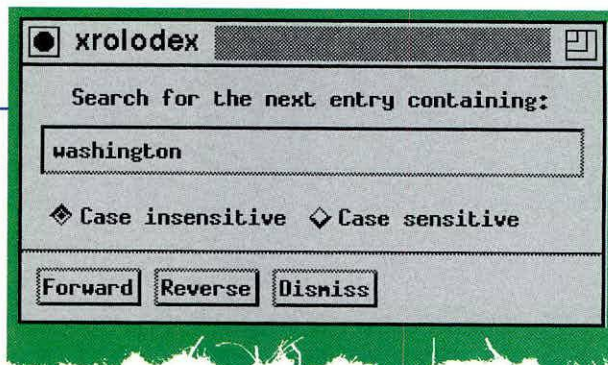
images). The book comes with a CD-ROM that contains source files for all the programs—plus binary files for many programs—over a number of platforms. Here's a sample from the book. ▼

A while back, the famed *twm* author Tom LaStrange challenged X hackers everywhere to come up with the best publicly available application based on the rolodex cardholder system. One of the products of that challenge was *xrolodex*. *xrolodex* is a (relatively) simple application for organizing names and addresses. Start up *xrolodex* with the name of a rolodex file. You can name the rolodex file anything you want, but a convention is to place it in your home directory with a *.xrolo* suffix (for example, *\$HOME/my.xrolo*).

```
% xrolodex my.xrolo
```

If the rolodex file does not exist yet, *xrolodex* comes up with an empty entry window. To start adding entries, just type in the window and press New/Ins.

When you have several entries, you can use *xrolodex* to search them easily. You can move to the first entry by pressing *First* and then page forward by pressing *Next*. Or you can go backwards by pressing *Last* and *Previous*. The order in which the entries appear may not be ideal; you can pull down the Sort menu



and select *Ascending* or *Descending* to sort the entries. (Since *xrolodex* doesn't understand first names vs. last names, it's a good idea to list all your entries last name first.) To find a particular entry, you can press *Index* to see a listing of the first lines of each entry (usually the person's name). Or you can pull down the *Find* menu and select *Find Entry* to specify a string to search.

Using the *Edit* pull-down menu, you can copy or delete an entire entry. You can also specify that an entry should be appended to the list (by default, they are inserted before the first entry). For editing within the text window, you can press the third mouse button to access a pop-up window allowing you to cut or copy a selection or paste a selection already in the clipboard. You can also perform a search and replace within the entry. Under the *File* pull-down menu, you can open a new rolodex file, save the current one, or quit. *Quit* and *Exit* are similar, except that *Exit* automatically saves the entry while *Quit* prompts you for whether the entry should be saved. Everything else about *xrolodex* is fairly straightforward. The manpage is close to useless, but if you need help, you can just pull down the *Help* menu. ■

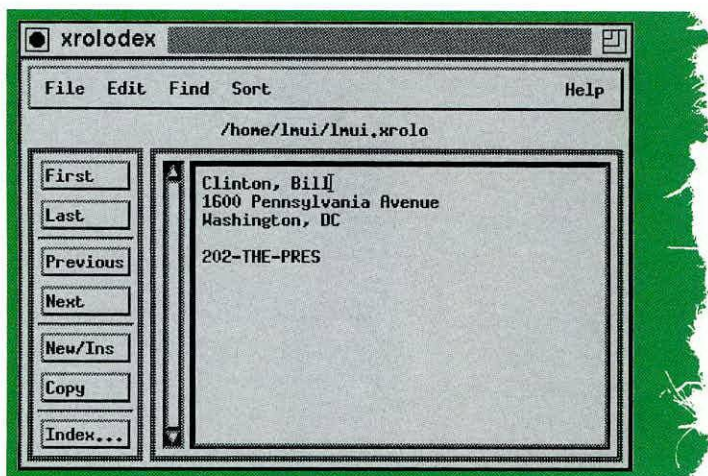
Linda Mui, a staff writer at O'Reilly & Associates, is coauthor of *termcap* and *terminfo* and *The X Window System Administrator's Guide*.

Excerpted from:

X User Tools

By Linda Mui & Valerie Quercia
1st Edition October 1994
856 pages, plus CD-ROM
ISBN 1-56592-019-8, \$49.95

See catalog page 25 for details.



What's New

WE'VE GOT SO MANY NEW BOOKS

to introduce in this issue of *ora.com*, only half of them fit in this department! Here you'll find a fascinating, inside look at the issues surrounding PGP, the popular encryption program that's captured the media's attention. Our new book, *PGP: Pretty Good Privacy*, is a comprehensive user's guide.

We also feature *The Frame Handbook*, which shows how to automate various formatting tasks in FrameMaker, and *Encyclopedia of Graphics File Formats*, a definitive, time-saving book and CD-ROM package. Plus we preview *The USENET Handbook*, due out in December.

Don't miss our other new titles spread throughout the magazine: *The Linux Network Administrator's Guide* (page 12), *POSIX.4* (page 54), *Managing Internet Information Services* (page 6), *Exploring Expect* (page 9), and new X11, R6 titles in the X Department (page 58).

The Privacy

CRYPTOGRAPHY used to be an arcane subject of interest only to the most secret military and intelligence agencies and to a handful of academics. Things have changed. Suddenly it seems that everyone is talking about encrypting their files and electronic mail. Internet fans are touting public key cryptography as a vital lane on the information highway. Former anti-war and nuclear freeze activists are now protesting against U.S. government cryptographic policy. Hackers who only yesterday were breaking into government and university computers are now demanding the right to secure their own communications. The new slogan is: "Encryption for the masses!"

WHAT'S GOING ON HERE?

The center of much of the excitement over encryption these days is a program called PGP, for Pretty Good Privacy. Written by Phil Zimmermann and first released in 1991, PGP actually provides *really* good privacy. It's a powerful piece of software that uses state-of-the-art cryptography to protect files and electronic mail. Freely available and widely distributed on the Internet, PGP has become very popular both in the U.S. and abroad. Its use extends well beyond the traditional realm of computer security products. Zimmermann tells stories about Burmese freedom fighters who keep

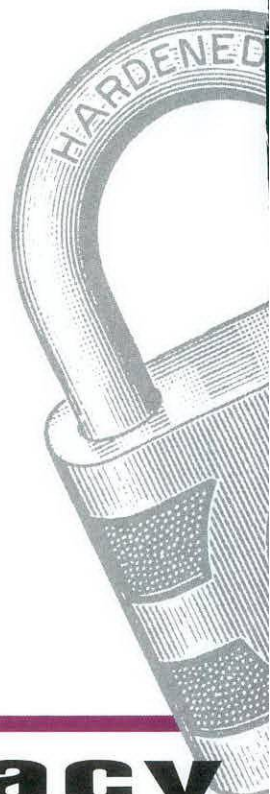
their communications hidden from government eyes by using PGP on PCs in jungle camps, about Eastern Europeans who believe that PGP will protect them in case their fragile republics collapse, and about a myriad of more pedestrian uses of PGP to protect business secrets and love letters.

Our new book, *PGP: Pretty Good Privacy*, by Simson Garfinkel, is both a highly readable technical user's guide and a fascinating behind-the-scenes look at the development and the politics of PGP and cryptography in general. The book is loaded with useful examples and comes with a tear-out command reference card.

PGP has gained widespread use despite—or maybe because of—an array of legal problems that have rallied public support for the program and its author by partisans of privacy and free speech. Its author has faced attacks on PGP from two powerful foes: the U.S. government on the one hand and RSA Data Security/Public Key Partners on the other, as we'll describe below.

WHAT DOES PGP DO?

PGP encrypts data files and electronic mail so their contents are completely private. PGP uses public key cryptography to encrypt keys, though it relies on much faster private key cryptography (the IDEA block cipher algorithm) to encrypt actual messages.





PGP

Wars

By Deborah Russell

To exchange encrypted mail with a friend—let's call him Joe—using PGP's public key cryptography, you and Joe must each have created two keys: a public key and a private key. You keep your private key a secret, but you let Joe (and anybody else you exchange mail with) know what your public key is. Joe, in turn, gives you a copy of his public key. When you send Joe a message, you encrypt your message with his public key. When Joe receives the message, he decrypts it with his secret key. Only Joe will be able to decrypt the message (you won't even be able to!).

PGP does more than encrypt. Its ability to produce digital signatures lets you "sign" and authenticate messages. A digital signature is a unique mathematical function derived from the message you send. You sign a message by applying your secret key to it before you send it. By checking the digital signature on a message, the recipient can make sure that the message hasn't been altered during transmission. The digital signature can also prove that you, and you alone, sent the message. No one (including you) can deny it.

PGP has a very easy-to-use command line interface, works on virtually every platform, and gives you many options that allow you to tune the program to your own security needs.

PGP AND PATENTS

PGP's use of public key cryptography invades the turf carved out by RSA Data Security and Public Key Partners, who say that the inner workings of PGP implements the patented RSA algorithm.

The RSA algorithm (named for its developers Ronald Rivest, Adi Shamir, and Leonard Adleman) was announced in a 1977 MIT technical report. That same year, MIT filed for a patent on RSA which was granted in 1983 (U.S. patent #4,405,829). The RSA patent and several other public key patents were exclusively licensed to Public Key Partners, a spinoff from RSA Data Security (founded by the RSA developers).

Because Zimmermann's PGP software uses the RSA public key algorithm, Public Key Partners' president Jim Bidzos threatened Zimmermann with legal action for violating patent law. Acrimony between the two has raged for several years.

Finally last spring, PGP came out of the legal shadows. A new version of the freely available (for noncommercial purposes) toolkit, RSAREF, was released by RSA Data Security. Zimmermann ripped out the PGP encryption engine and replaced it with the RSAREF toolkit. Although it's likely that Bidzos never intended the toolkit to give PGP a break in this way, it nevertheless cleared the way for PGP's legitimacy.

SOME CRYPTOGRAPHY DEFINITIONS

Encryption scrambles or transforms an original message, called plaintext or cleartext, into ciphertext. The inverse operation, decryption, transforms the ciphertext back to the original plaintext. The technique used for encryption—the encryption algorithm—determines how simple or how complex the transformation will be. Most encryption algorithms use a key to encrypt and decrypt the message. Modern cryptographic systems fall into two general categories, identified by the types of keys they use: private key and public key systems.

PUBLIC KEYS

PGP public keys are exchanged freely. Several key servers (essentially "Public Key White Pages") list these keys. Simson Garfinkel's public key is:

```
mQCNAi4mq/gAAEEAPcbmtIyFTyqdpwU3HFP7
XEIBGu1CXXKzpxDgDY21gKwy5uJnxsSbTaz//
AxrHE6R1LXZXnZgEFJWp/AIrlPdWjKciRJFIv
qdqooyZHSPFQ9r8oS3Fq+0xPpOCEyPDb9+Ghv
9HYcIepLwJJrcORinor5ZdzfWRyW13D7CbCQP
JJ1AAURtC9TaW1zb24gR2FyZmlua2VsIDxzaw
1zb25nQG51eHQuY2FtYnJpZGdlLm1hLnVzPg=
==Gv/9
```

continued on page 64 ►

In May of 1994, MIT, Bidzos, and Zimmermann agreed to a new deal for PGP. MIT would become the official distribution site for a new version of PGP, 2.6. Zimmermann would make changes so that messages encrypted by 2.6 after September 1994 would not be readable by earlier versions of PGP. And RSA/PKP would not pursue its legal battles with Zimmermann.

PGP AND EXPORT RESTRICTIONS

In the eyes of the U.S. government, cryptography—even the weakest kind—is considered to be munitions. The most dangerous arms dealer and the most mild-mannered cryptographer are equally suspicious characters. The government closely regulates the sale and export of crypto. Government spokespeople say that export regulations are intended to restrict the use of products that could ultimately make an enemy nation's communications more difficult for U.S. intelligence agencies to decipher.

How To Get PGP

Although PGP is available from many different sites on the Internet and various BBSs, the primary distribution site for PGP 2.6 (in the U.S. only for noncommercial use) is MIT at:

`net-dist.mit.edu` (in the `/pub/PGP` directory)

ViaCrypt sells a commercial version of the PGP that corporations can legally use. Contact them at:

Voice: 602-944-0773

FAX: 602-943-2601

Internet: viacrypt@acm.org

CompuServe: 70304.41

In most cases, if you export PGP or any other cryptographic product (even one built into your operating system or application package), you will be violating State Department, Defense Department, and Commerce Department regulations. The only way to export crypto legally outside the U.S. is with a license granted by the State Department Office of Munitions Control through the International Traffic in Arms Regulations (ITARs).

Despite these regulations, PGP got out of the U.S. early and often. Zimmermann says he never sent the software abroad himself, but through the magic of the Internet a few copies abroad became hundreds, and soon many thousands.

In an odd blend of patent and export issues, Zimmermann is the target of an investigation by the U.S. Customs Agency for allegedly sending stolen software outside the U.S. and allegedly violating the U.S. export restrictions on cryptographic software. As a consequence, he could face a jail term.

PGP AND THE CLIPPER CHIP

Not coincidentally, PGP has reared its populist head at the same time that the U.S. government's Clipper Chip proposals have come under public scrutiny.

What is Clipper? It's an encryption chip based on a classified cryptographics algorithm called Skipjack that is said to be more powerful than any available to ordinary citizens in the past. The U.S. government wants private industry to build Clipper into telephones, FAX machines, and other communication products so encryption would be part of our communications. Clipper is expected to be relatively cheap, virtually unbreakable, and (unlike most strong cryptography) available to everyone, not just spies and sleuths. So, what's the catch?

The catch—and one that has civil libertarians and those who call themselves Cypherpunks raging—is that built into Clipper is a "back door" concept called key escrow. You and I can shield our communications from most of the world because we share a secret key. But we're not completely secure. At the time our secret keys were assigned, an extra copy was entrusted to the care of the government. If somewhere down the road the government suspects that we are planning a crime or an uprising, an agency like the FBI would (with a wiretap order) be able to use the escrowed key to listen in on our communications.

The Clipper debate rages. On one side, the government warns that, without Clipper, nuclear terrorists, drug dealers,

and pedophiles will roam freely in cyberspace. On the other, respected academics, the Electronic Frontier Foundation, and grass roots Cypherpunks demand electronic privacy as a basic right and warn of Big Brother.

Zimmermann's attack on Clipper, through PGP, is more subtle than most being mounted. To a large extent, the very existence of PGP—virtually unbreakable, free, and unencumbered by the key escrow threat—represents the most serious threat to Clipper, simply because it offers such an attractive alternative for those who crave privacy but fear governmental interference.

Zimmermann writes:

If privacy is outlawed, only outlaws will have privacy. Intelligence agencies have access to good cryptographic technology. So do the big arms and drug traffickers. So do defense contractors, oil companies, and other corporate giants. But ordinary people and grassroots political organizations mostly have not had access to affordable "military grade" public key cryptographic technology. Until now.

The world of modern cryptography is one that extends beyond the narrow confines of technology to touch upon fundamental issues of privacy, government control, and personal freedom. Just as PGP is more than simply a piece of software, *PGP: Pretty Good Privacy* is more than simply a Nutshell Handbook™ for the use of the program. We think you'll find its technical exposition informative and its background stories thought provoking. Wherever you stand on the issues raised by PGP, Clipper, and privacy initiatives, you'll find something of value in this wide-ranging book. ■

Deborah Russell is the editor of the O'Reilly & Associates' computer security series and the coauthor of Computer Security Basics and Love Your Job.

Simson Garfinkel is a journalist and the author of Practical UNIX Security (O'Reilly & Associates), NeXTStep Programming (Springer-Verlag), and The UNIX-Haters Handbook (IDG).

PGP: Pretty Good Privacy

By Simson Garfinkel

1st Edition December 1994 (est.)

400 pages (est.), ISBN 1-56592-098-8

\$24.95 (est.) See catalog page 24 for details.

Producing Quality Documents with Framemaker

By Mike Sierra

FrameMaker, the powerful desktop publishing program that runs on X Windows and most other windowing systems, enables users to produce top-quality typeset documents. It has fast become the system of choice among technical writers and editors, who use it every day, as well as engineers and administrative assistants, who may use it only occasionally.

When Linda Branagan and I put together *The Frame Handbook*, we concentrated on describing the program as simply as possible, and in terms of how users at all levels are likely to use it. We've focused the book on the X Windows version of the program (4.0 release), although there is, in fact, not much difference between the various applications. Conceptually, you can read the book to learn FrameMaker on Windows or the Mac.

A GUIDE FOR NEW AND EXPERIENCED USERS

We start by describing all the things you can do within a single document: everything from simple editing to setting up complex graphics and reusable formatting objects such as paragraph tags. We then describe how to work with multiple documents: assembling books, generating indexes and tables of contents, and keeping formats consistent. We conclude with a discussion of how to maintain two versions of the same document with "conditional" text: one standard version to be printed and one hypertext version to be browsed online.

For experienced Frame users, we've also included dozens of tips and tricks—techniques to get around seemingly insurmountable problems and bugs, as well as interesting projects to allow you to perform tasks you might not have thought possible. Usually there's more than one way to approach a formatting task, and we often evaluate their various strengths and weaknesses. Much of this more advanced information can't be found anywhere else, except perhaps in frantic exchanges on *comp.text.frame*.

USING MASTER INDEXES

One technique we've found especially helpful is master indexes—an index that spans more than one book and indicates in which book to find a certain page number (e.g., IV-253). You can create a really big book file that includes pointers to all the chapters from the various books. For each file name, you then use the "Set Up" menu item to specify a prefix that is to be added to the page numbers in the generated index. For each title page and chapter 1 file, you also set up the page numbers to restart at 1.

NUMBERING HEADINGS AUTOMATICALLY

Another helpful technique is automatic numbering of headings and captions, which involves setting up a complex scheme for numbered headings, figures, and tables—all of which use the chapter number as a prefix (e.g., "Figure 5-2," "Section 5.8.4"). The seemingly correct approach would be to set up separate numbering "streams" that allow figures and tables to number independently, but it turns out that separate numbering streams can't "share" external information such as the chapter number. The way to do it is to set up a single numbering stream for all the paragraphs.

AUTOMATING TABS

My favorite tip in the book describes how to automate cascading, dictionary-style bleeding tabs, which allow readers to find the right chapter by flipping to the right tab that runs off the margin—in each chapter they appear further down the page. You can still implement them without automating them, but you'd have to set them by hand in each chapter. (The technique is a bit too hairy to describe here, but it exploits FrameMaker to its fullest.)

The Frame Handbook shows how to automate various formatting tasks and how to maintain consistency across a large number of complex documents. FrameMaker has the capacity to solve many problems in document production, especially if you know some of the tricks and insider's tips to using it. That's what we've tried to provide in this book. ■

Mike Sierra is a production editor at O'Reilly & Associates. He has produced books with PageMaker, Microsoft Word, troff, and now FrameMaker.

The Frame Handbook: Building FrameMaker Documents That Work

By Linda Branagan & Mike Sierra
1st Edition October 1994 (est.)
500 pages (est.), ISBN 1-56592-009-0
\$39.95 (est.) See catalog page 25 for details.

```
Chapter:      H:Chapter<n+>           - Chapter 5
A-Head:      H:<n>.<n+>< =0>< =0>< >< > - 5.4
B-Head:      H:<n>.<n>.<n+>< =0>< >< > - 5.4.1
C-Head:      H:<n>.<n>.<n>.<n+>< >< > - 5.4.1.3
Figure:      H:Figure <n>< >< >< >< -<n+>< > - Figure 5-11
Table:       H:Table <n>< >< >< >< >< -<n+> - Table 5-3
              (numbers independently)

(Key:) Numbering stream identifier
      Column 1: Chapter number
      Column 2: A-head number
      Column 3: B-head number
      Column 4: C-head number
      Column 5: Figure number
      Column 6: Table number
      - Examples

<n+>: increments the number
<n>: maintains and displays the number
< >: maintains number without displaying
<n=1>: specifies a value while displaying
< =0>: resets number to zero without displaying
```

In many ways creating a FrameMaker template is like programming. To set up automatic numbering of headings and captions, you'd use a scheme like this.

GRAPHICS FILE FORMATS COVERED IN THE BOOK

File format specifications, code examples, and/or test images for most of these formats are also included on the CD-ROM.

Adobe Photoshop
Atari ST Graphics Formats
AutoCAD DXF
BDF
BRL-CAD
BUFR
CALS Raster
CGM
CMU Formats
DKB
Dore Raster File Format
Dr. Halo
Encapsulated PostScript
FaceSaver
FAX Formats
FITS
FLI
GEM Raster
GEM VDI
GIF
GRASP
GRIB
Harvard Graphics
Hierarchical Data Format
IGES
Inset PIX
Intel DVI
Interchange File Format
JPEG File Interchange Format
Kodak Photo CD
Kodak YCC
Lotus DIF
Lotus PIC
Lumena Paint
Macintosh Paint
Macintosh PICT
Microsoft Paint
Microsoft RIFF
Microsoft RTF
Microsoft SYLK

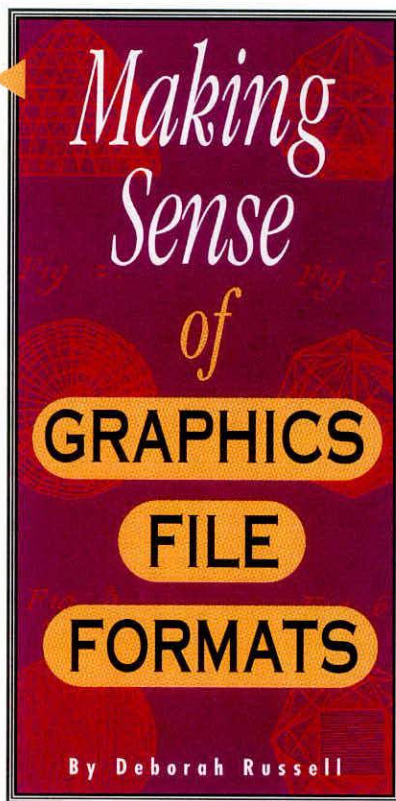
The computer graphics world is an alphabet soup of acronyms: BMP, CGM, DXF, EPS, GIF, JFIF, MPEG, PCX, PIC, RIFF, RTF, TGA, and TIFF are only a few of the many different file formats used to store graphics images, which range from black-and-white photographs to true color images to motion video and multimedia.

Information on graphics file formats is surprisingly hard to come by. By far the most precious source of information about a particular format is the file format specification itself. Straight from the horse's mouth, this document is written by the inventor of the format, is maintained by the inventor or by a vendor who has taken responsibility for maintaining it, and may be made available to those who need detailed internal information about it.

That's the theory, anyway! In fact, specification documents are scarce; sometimes there is no written document at all, and graphics programmers soon become conversant with the oral tradition. Frequently, the documents are poorly written and don't necessarily tell you everything you need to know. And they may very well not be available to the curious—or even the desperate. Often the owner of a format is hard to find; sometimes the specs are even considered to be proprietary documents, and vendors have gone so far as to threaten legal action against developers who publish the details of a particular format.

Graphics programmers are continually frustrated by the lack of solid and accessible information about file formats. They beg vendors for specs, besiege bulletin boards and newsgroups with requests for information, and end up puzzling out file formats with partial specs or borrowed and out-of-date documents. They become sad and desperate creatures!

That's been the situation in the computer graphics world for a long time. In typical O'Reilly fashion, we saw this forest of confusion and despair as an opportunity to make a difference. And it's our hope that the newly published *Encyclopedia of Graphics File Formats* will make that difference.



CONCEIVING THE BOOK

When James Murray first started working on a graphics file formats book several years ago, he thought of it mainly as a book for programmers who needed to implement the major file formats: BMP, GIF, TIFF, TGA, PCX, and a few more. He'd hit a wall, though, with the departure of his coauthor, and he wasn't sure what to do with his unfinished manuscript. When he came to O'Reilly & Associates for guidance, I asked a graphics programmer I knew, William vanRyper, to help me assess the quality of what James had produced. The more William and I talked about James's project, the more we evolved a vision of what the book could become. I asked William if he'd like to work with James—and James if he'd like to work with William—and we set out on a whole new track.

We decided that what was needed in the market was a really definitive, encyclopedic, and multiplatform book on graphics file formats. There were a number of books containing information on the common formats and some network sites where programmers could obtain specification documents for certain commonly used formats (GIF, for example). But there was no single source. We wanted to be that single source. We wanted to cover all of the major formats, as well as a host of minor ones, that were used for

graphics file interchange. We wanted to include many different types of formats as well. Bitmap formats tend to be the focus for most authors, but there are other types of formats: vector, metafile, animation, scene description, and multimedia.

From the beginning we agreed that the file format specifications themselves were key. We were going to include a lot of solid information about file formats, conversion issues, and compression methods in the book. But we felt strongly that the biggest contribution we could make to the industry was to pull together all of the actual file format specifications that, until now, were hiding in corporate nooks and crannies, individual authors' garages, and poorly publicized network sites. Although, as we've pointed out, the specifications don't always tell the full story in the clearest possible way, they do represent an invaluable source of basic information about graphics formats.

It didn't take us long to conclude that including the file format specifications in the book itself was simply not feasible. The information we wanted to include was much too voluminous. So we turned to another medium—CD-ROM. On a CD-ROM we could include many thousands of pages of text. We soon realized that the huge capacity of the CD-ROM made it possible for us to include other sources of information as well—test images in GIF, TIFF, BMP, and other formats; code examples that let you read, write, and otherwise manipulate graphics files; and perhaps some graphics software packages.

THE QUEST FOR THE SPECS

While work progressed on the book itself, we undertook a parallel, behind-the-scenes effort to obtain the specification documents from vendors and individual authors. In addition to getting access to the documents, we'd need to get permission from their owners allowing us to include the material on the CD-ROM. Not an easy job!

We found ourselves in Sherlock Holmes mode, hunting for clues to the location of elusive file formats. We made phone calls; we sent email, registered letters, and faxes; we called in

favors from friends who worked in large and impenetrable organizations. Sometimes, after months of searching, we'd finally find a helpful person in a company (in the interest of harmony, we won't use any names here!) who would promise to help track down a spec in-house. We'd call back a week later, and they'd have been transferred, or retired, or struck by lightning. Sometimes the spec would arrive, but unaccompanied by a permission form. Or it would arrive in an odd and archaic word processing format that had to be converted to ASCII for inclusion on the CD-ROM. For many formats we were reduced to OCR'ing printed specs.

Our quest for certain key format specs resembled nothing so much as the search for the Holy Grail. A few promised specs have never materialized. Each of us still tells stories about the ones that got away. And yet, hope springs eternal. Optimistic still, we hope to be able to acquire those last precious specs for the second edition of the book.

THERE'S SOFTWARE, TOO

Given the huge number of graphics file formats around, there is a pressing need to be able to convert from one format to another. There is also a need to

manipulate graphics images—to reduce, enlarge, darken, lighten, dither, scale, and otherwise fiddle with them so they can be transmitted or included in a document. Responding to this need, many excellent graphics programs have been developed, and a surprising number are publicly available on the Internet or on commercial services such as CompuServe.

Portable Bitmap Utilities (*pbmplus*) is a very popular conversion program for UNIX. There are similar programs for the PC and the Macintosh. There are also some excellent libraries of programs for specific graphics formats (like TIFF and GIF) and standards (like JPEG and MPEG). We decided that we wanted to include a selection of this software on the CD-ROM so our readers could convert and manipulate files, as well as understand the formats in which they were stored.

IN SUMMARY

All in all, we're pretty satisfied with the number of file format specifications and programs we've been able to accumulate for this book and CD-ROM. We're very grateful to the people at organizations that maintain graphics file formats—Apple, Microsoft, IBM, Silicon Graphics, Adobe, Truevision, Autodesk, Inset Systems, Pictor, Wavefront, and

many more—that helped us acquire specification documents and permission to include them. We're also grateful to the individual format and software authors who let us include their specs and programs.

After all the travail, we think the result has made the labor worthwhile. We managed to describe nearly 100 formats and to include specs, images, and/or code examples for most of them on the CD-ROM. We call the book/CD package an "information resource," and that's really what it is. We hope you'll enjoy what we've been able to produce. ■

Deborah Russell is the editor of the O'Reilly & Associates' computer security series and the coauthor of Computer Security Basics and Love Your Job.

James D. Murray specializes in serial communications, image processing and analysis, UNIX systems programming, and object-oriented programming.

William vanRyper has been writing state-of-the-art graphics software since 1982 and has designed visualization systems, animation, and drawing packages for many major corporate clients.

Encyclopedia of Graphics File Formats

By James D. Murray & William vanRyper
1st Edition July 1994
928 pages, plus CD-ROM
ISBN 1-56592-058-9, \$59.95
See catalog page 26 for details.

Unlocking the Secrets of USENET

By Mike Loukides

Discussion groups have been networking's "killer application" since it started. From the first ARPANET mailing lists to DOS BBSs to the modern USENET, the ability to hold discussions has attracted people to electronic communication by the thousands. Electronic mail may be the most necessary application, but discussion groups become obsessions.

USENET, also called Netnews, is the world's largest discussion forum. It's a place for asking and answering technical questions, arguing about politics, religion, and society, or discussing most scientific, artistic, or humanistic disciplines. You'll be surprised by who you meet; it's common for a simple question to be answered by a noted authority. USENET is also a forum

for distributing free software, digitized pictures and sounds, and many other things. With the appropriate licensing, you can even get a complete newspaper.

Although the Internet now carries a lot of USENET's traffic, it's important to realize that USENET was around first and still reaches many places that aren't yet connected to the Internet. If you have an Internet connection you can read News as part of the deal; but if you don't yet have an Internet connection you can still participate by finding someone willing to pass a USENET feed along to you.

The USENET Handbook unlocks USENET for you. It's not just a technical book, although it includes tutorials on the

most popular newsreaders for UNIX and Windows (*tin*, *nn*, *GNUS*, and *Trumpet*). It also explains what goes on on the Net: where to look for information and what to do with it once you get it. It also gives you an introduction to the culture: Net etiquette, the private language, and some of the history, including some of the more notable practical jokes and pranks. ■

Mike Loukides is an editor at O'Reilly & Associates.

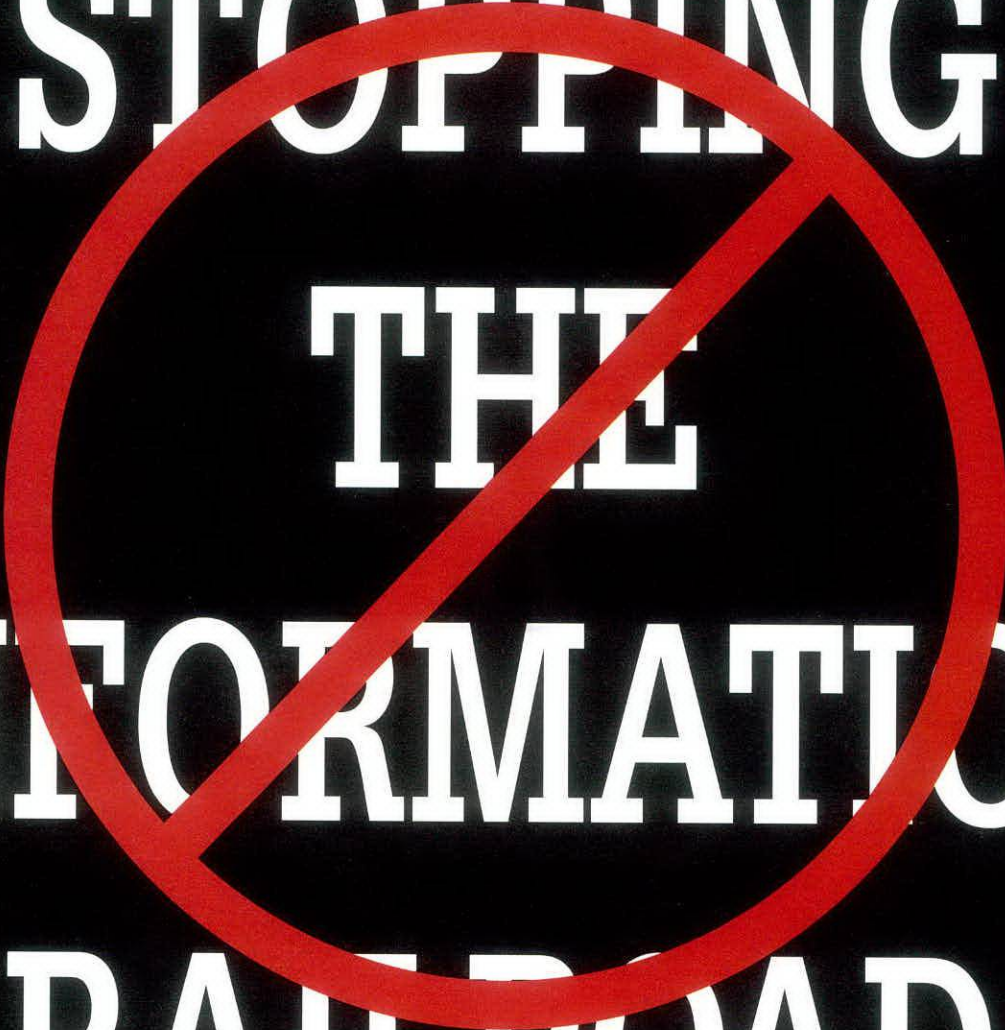
The USENET Handbook: A User's Guide to NetNews

By Mark Harrison
1st Edition December 1994 (est.)
250 pages (est.), ISBN 1-56592-101-1
\$24.95 (est.)
See catalog page 25 for details.

Graphics File Format
Covered in the book
(continued)

Microsoft Windows
Bitmap
Microsoft Windows
Metafile
MIFF
MPEG
MTV
NAPLPS
NFF
OFF
OS/2 Bitmap
P3D
PBM, PGM, PNM,
and PPM
PCX
PDS
Pictor PC Paint
Pixar RIB
Plot-10
POV
Presentation
Manager Metafile
PRT
QRT
QuickTime
Radiance
Rayshade
RIX
RTrace
SGI Image File
Format
SGI Inventor
SGI YAODL
SGO
Sun Icon
Sun Raster
TDDD
TGA
TIFF
TTDDD
uRay
Utah RLE
VICAR2
VIFF
VIS-5D
Vivid and Bob
Wavefront OBJ
Wavefront RLA
WordPerfect
Graphics Metafile
XBM
XPM
XWD

STOPPING THE INFORMATION RAILROAD



By John Perry Barlow

We have to get the government to recognize the futility of the crypto embargo. It would be nice if they recognized that the cold war is over, but that may take some time, and even then, we'll still have to deal with the

There has been an awful lot of unfortunate talk about the national information structure being a lot like some kind of superhighway. It's no mistake that Al Gore likes that metaphor, because his father was instrumental in implementing the interstate system. But in fact, what has been going on lately reminds me of the development of the railroads in this country.

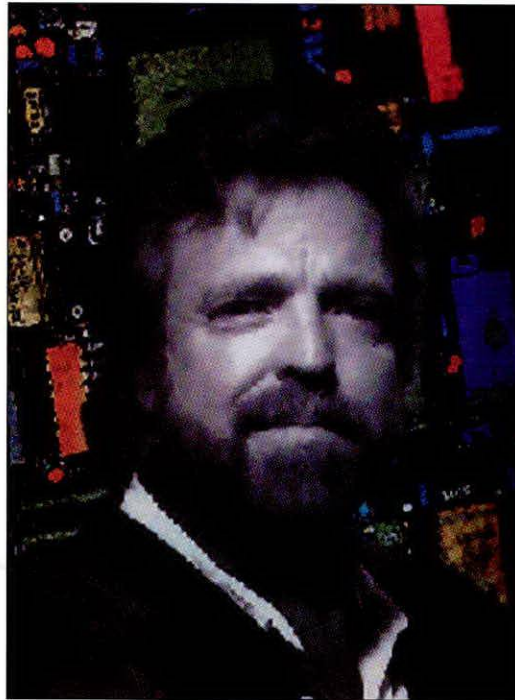
Jay Gould and his fellow barbarians who created the railway system in the West knew that if they owned the roadbed and the area around it, they also essentially owned the society that would develop there, because they could tariff that society's products at their own whim. The West today is still trying to get out from underneath the burden of regulation and legal standardization that the railroad men created in those early days.

Eventually, it became almost impossible for farmers in the upper Midwest to make a living, even though the Northern Pacific Railroad had asked them to come in for nothing and had given them land. As soon as they got established on that land, they were charged usurious rates for transporting their product to market.

So if we look at the history of the railroad, we can see what kind of damage occurs when you give too few people too much control over too much of the economy.

THE MODERN DIGITAL ENVIRONMENT

Unfortunately, the organizations and institutions now entering the digital communications game are very different from those that previously characterized the development of networking. They come at this with a different paradigm of how the world works and how to create order. They come at it with the notion that order is something you impose, not something that emerges. They come at it thinking about their product as something that is focused and centralized, that requires large amounts of capital to create, and that is broadcast as a one-to-many medium. I don't think these are necessarily bad people, but they have a very hard time understanding the modern digital environment.



Most of the folks I talk to in the television industry think that interactive television consists of putting a "Buy" button on your channel clicker. I'm not kidding. They fail to understand the profound difference between information and experience, and they are trying to sell non-interactive, stored information as though it were experience. I think they actually believe they are accomplishing that task. They are going to try in many ways to impose their culture and their metaphors in this environment.

THE FUTILITY OF THE CRYPTO EMBARGO

Another particularly troubling and difficult-to-solve issue is cryptography, and the government is really not even on the chart with this yet. Al Gore is a good guy and a smart guy, but when I talked to him about cryptography, he said, "Well, we have national security interests at stake." I think we need to think long and hard about whether or not our national security interests are really addressed by trying to impose export embargoes on cryptographic code.

four horsemen of the apocalypse: kiddie pornographers, drug lords, terrorists, and unnamed foreign enemies.

◀ *John Perry Barlow, a retired Wyoming cattle rancher and lyricist for the Grateful Dead, is one of our most insightful commentators on cyberspace and our national information infrastructure. In 1990 he cofounded the Electronic Frontier Foundation (EFF) to ensure that the principles embodied in the Constitution and the Bill of Rights are protected as new communications technologies emerge. For more information on EFF, email info@eff.org or call 202-347-5400.*

Continued on page 72

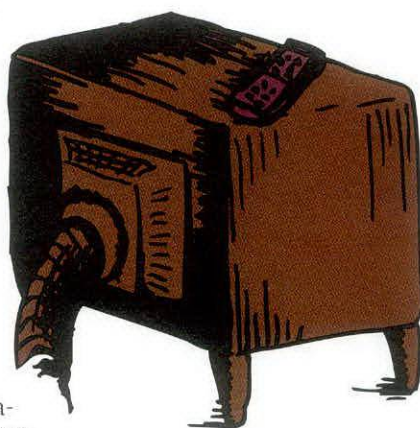
Of Couch Potatoes and Moguls

By Stephen L. Talbott

Note: The George Gilder quotations in this article are taken from The Economist (9/11/93) and Wired (1.4). Gilder is a senior fellow of the Discovery Institute in Seattle.

GEORGE GILDER's head is abuzz with facts and figures about the technologies that will "come blindingly to the fore" during the next few years. His central conviction is that peer-to-peer communication will replace broadcast (radio/TV) and switched (telephone) communication. "Whether offering 500 channels or thousands, television will be irrelevant in a world without channels, where you can always order exactly what you want when you want it, and where every terminal commands the communications power of a broadcast station today."

The reason for this is that "fiber optics is going to render bandwidth and hertz virtually free." We will no longer have to choose from among communication channels dictated by others. Rather, we will simply sit at our terminals and tune in to whatever we wish, anywhere in what Gilder calls "fiber-space." One thread of glass the width of a human hair, he tells us, can carry 1000 times the content of today's entire radio spectrum. So we will all have access to everything and can speak to everywhere.



Gilder's technical vision is not in any way bizarre, and for all I know it may be right on the mark. What startles is his seemingly willful naivete when it comes to predicting the social consequences. Noting the "100,000 acts of television violence" watched by the average 13-year-old child, and citing the "obtuse denial that such a diet could affect behavior," he goes on to indict the television industry, which "ignores the fact that people are not inherently couch potatoes; given a chance, they talk back and interact. People have little in common with one another except their prurient interests and morbid fears and anxieties. Aiming its fare at this lowest-common denominator target, television gets worse year after year."

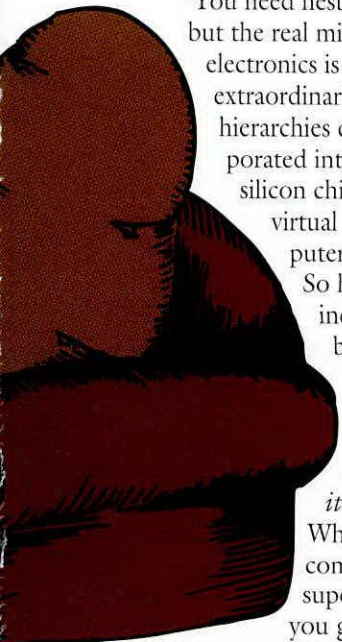


And what does Gilder believe will save us from television? The fact that, instead of 500 channels to choose from, we can choose *anything*—and can talk back if we want. When intelligence and control are embedded in the devices at our fingertips, it means that "technologies are much more servants than rulers of your life."

Moreover, we can be assured that "confidence in the new paradigm . . . does not spring only from the desire for a better culture, and it cannot be stemmed by some new global plague of passivity and tube addiction." Why? Because "propelling the new order is the most powerful juggernaut in the history of technology: an impending millionfold rise in the cost-effectiveness of computers and their networks." Somehow this apparently means that the new, whizzy devices will also have a power of psychological and social healing.

The Silicon Hierarchy

Gilder was asked about the “utopian” ring of his hope, since “anything complex self-organizes into nested hierarchies, just in order to manage itself”—a patently false assumption by the interviewer, incidentally, since it doesn’t apply to living organisms. But Gilder’s response couldn’t be more telling:



“You need nested hierarchies, but the real miracle of micro-electronics is that these extraordinarily complex hierarchies can be incorporated into individual silicon chips, with virtual supercomputer capabilities. So hierarchies do indeed exist, but they are ubiquitously distributed, which renders them an egalitarian force.

When everybody commands a supercomputer, you give the

average owner of a work station the power that an industrial tycoon commanded in the industrial era, or that a TV station owner commands in the age of broadcasting. *In other words, the hierarchy is in the silicon rather than in the human organization.* So you have this incredible distribution of power.” [Emphasis added.]

So where the industrial tycoons and TV station owners blew it, unaccountably tempted by crass gain, the rest of us—once we can grab power for ourselves—will save the day. If we have intelligent and discriminating devices at our fingertips, we will use them intelligently and discriminatingly. If we can address anything we wish to anyone we wish, we will speak with a previously unwonted maturity. We’re no longer going to let those TV moguls keep us down and reveling in smut.

The Emerging Complex Order

Gilder cites the Internet, with its distributed intelligence, as “an exciting kind of metaphor for spontaneous order.” Dumb the Net down by eliminating the central, controlling intelligence, distribute that intelligence to the periphery where it is under control of a hundred million users, and wondrous patterns of human beauty will take shape within the flexible, receptive, glass palace of fiberspace.

Yes, order arises from complexity, but it arises through complex laws, not magic. And in all social affairs the *nature* of the order depends upon the nature of the human being. We have already found that we could not create a healthy order in televisionland when the task was as simple as changing the channel to register our preference for superior programming. Will we now find it easier to impose healthy order upon the Internet by redirecting our proclivities toward a vastly more diffuse and challenging task?

It is precisely *because* a complex order of one sort or another will emerge from the new technologies that we must be cautious. The order is not given in advance, and is not inherent in the technology itself, which only defines the most extreme range of possibilities. The form we give to those possibilities will reflect ourselves. Fiberspace is a glass mirror. The only question is whether we will struggle through to what is highest in us, or whether instead we will give way to those same subterranean, overmastering currents that seemed always to have the last say when we clicked the remote control.

The Challenges Ahead

It is not a matter of bemoaning everyone’s bad taste and trying to protect people from themselves. It’s a matter of realism about the challenges ahead of us. Gilder fails to reckon with this truth: the more complex and indirect the mechanisms through which human actions come to expression, *the more you and I must be masters of our-*

selves. Putting it the other way around: the more degrees of freedom we have in expressing ourselves—in projecting ourselves every which way into our environment—the easier it is for the emergent social pattern to be taken over by unruly collective, or subconscious, powers—easier, that is, unless each of us manages to be uncommonly *awake*.

Far from being able to relax about what emerges from complexity, we are being asked today to take conscious responsibility in one domain after another that our ancestors could not even have named, let alone have thought about. From the environment to the rule of law among nations, from genetic engineering to virtual realities, from failing social structures to failing value systems, the message is unambiguous: “You can no longer remain unconscious where you slept before; one way or the other, you are creating your future. Wake up before you find that the devils within you have done the creating.”

This article is excerpted from “Networks and Communities” in The Future Does Not Compute, available from O’Reilly in early 1995.

Steve Talbott is an editor at O’Reilly & Associates. He lives with his family in rural New York.

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The only question is whether we will struggle through to what is highest in us, or whether instead we will give way to those same subterranean, overmastering currents that seemed always to have the last say when we clicked the remote control.

Most of the folks I talk to in the television industry think that interactive television consists of putting a "Buy" button on your channel clicker. I'm not kidding. They fail to understand the profound difference between information and experience, and they are trying to sell noninteractive, stored information as though it were experience.

This strikes me as being like trying to impose embargoes on wind. You can get PGP from FTP sites all over the world in seconds, so I'm not sure what they're accomplishing, except a chilling effect on the ability of American corporations to incorporate robust cryptography into the software and hardware they design, because obviously it doesn't make sense to build a system and put in a cryptographic standard that the NSA won't allow you to ship overseas. You don't want to have to build one system for the United States and another for overseas sales, especially in a business that exports as much of its product as we do in the hardware and software industries.

We have to get the government to recognize the futility of the crypto embargo. It would be nice if they recognized that the cold war is over, but that may take some time, and even then, we'll still have to deal with the four horsemen of the apocalypse: kiddie pornographers, drug lords, terrorists, and unnamed foreign enemies. These monsters are rattled out every time I suggest it might be a good idea to free up cryptography. I think they are all fairly illusory beasts at this point.

THE NSA: A STALKING HORSE

I think the NSA is acting as a stalking horse for the FBI and other domestic law enforcement agencies that are scared to death they'll lose their ability to wiretap, as analog communications become some kind of digital fruit salad. They don't yet see the great technological opportunities that digitization will offer them. We need to see that and deal with it accordingly. We may be hurtling toward a future in which every single thing we do will be visible to the government. As it is right now, every time you make a financial transaction, you smear your fingerprints all over cyberspace. This does not need to be the case, but it's going to take a lot of changing consciousness to have it be otherwise.

Whatever else it's up to, the government certainly has no intention of building the national data superhighway. They know that's not something they can afford, or something that they should be doing. What they are doing instead, is trying to create the right economic environment, so that it can be built by private industry. That's really the appropriate approach, as long as you can put in place certain standards for behavior that will help private industry act in a democratizing rather than plutocratizing kind of way.

THE GENIUS OF DISTRIBUTED COMMUNICATION

One of the great geniuses of distributed communication systems is the way meta-decisions about the Internet emerge from little collective decisions made all around its outer boundaries. There is something enormously democratizing about this. It's a powerful system that the old structural methods will have a difficult time competing with. In spite of the fact that they have a lot of money behind them, they don't have the same kind of passion. They don't have the same sense of personal investment and involvement in what they are doing that people who are building the Internet do.

I see two great economic opportunities here—one for virtual editing and the other for virtual community. Bringing people together and providing them a rich medium to interact with one another will be very successful business models, and they're not the sort of thing that the phone companies will ever know very much about running.

Excerpted from Notable Speeches of the Information Age: John Perry Barlow.

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